Timber Creek Timber Sale

Environmental Assessment

April 11, 2007

Montana Department of Natural Resources and Conservation
Southwestern Land Office
Missoula Unit

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TIMBER CREEK TIMBER SALE

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed Timber Creek Timber Sale prepared by the Montana Department of Natural Resources and Conservation (DNRC). After a review of the EA, project file, public correspondence, Department Administrative Rules, policies, and the State Forest Land Management Plan (SFLMP), I have made the following decisions:

1. ALTERNATIVE SELECTED

Two alternatives were presented and the effects of each alternative were fully analyzed in the EA:

1. **Alternative A:** Deferred Harvest (No Action Alternative)
2. **Alternative B:** Harvest (Action Alternative)

Alternative B proposes to harvest approximately 1,500,000 board feet of timber on 243 acres. Alternative A does not include the harvest of any timber. Subsequent review determined that the alternatives, as presented, constituted a reasonable range of potential activities.

For the following reasons, I have selected the Action Alternative without additional modifications:

a) The Action Alternative meets the Project Need and the specific project objectives as described on pages 6 through 8 of the EA. The Action Alternative would produce an estimated $300,000 ($200/MBF) return to the Common School (CS) Trust, while providing a mechanism whereby the existing timber stands would be moved towards conditions more like those, which existed historically.

b) The analysis of identified issues did not disclose any reason compelling the DNRC to not implement the timber sale.

c) The Action Alternative includes mitigation activities to address environmental concerns identified during both the Public Scoping phase and the project analysis.

2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that the implementation of Alternative B will not have significant impacts on the human environment:

a) **Soils-**Leaving 10-15 tons of large, woody debris on site will provide for long-term soil productivity. Harvest mitigation measures such as skid trail planning and season of use limitations will limit the potential for severe soil impacts.

b) **Water Quality-**The Action Alternative would improve the surface drainage on existing roads, install culverts, clean ditches and culverts and place gravel and silt fences in isolated areas, thereby reducing the amount of current sedimentation within the project area. Water Quality Best Management Practices for Montana Forests (BMP's) and the Streamside Management Zone (SMZ) law will be strictly adhered to during all operations involved with the implementation of the Action Alternative.

c) **Cumulative Watershed Effects-**Estimated increases in annual water yield for the proposed action has been determined to be negligible by the DNRC Hydrologist. Increases in sediment yield are expected to be negligible due to the amount of area treated, location along the landscape, replacement and/or improvement of existing culverts and mitigations designed to minimize erosion.

d) **Cold Water Fisheries**- Due to planning and associated mitigation, it is unlikely that the proposed timber sale will affect large woody debris recruitment, shade or in-stream temperature in any fish-bearing streams within the project area.

e) **Air Quality-**Any slash burning conducted as part of the Timber Creek Timber Sale will be conducted in coordination with the Montana/Idaho Airshed group in order to ensure that ideal smoke dispersion conditions exist prior to ignition and throughout the duration of any burning operations. As a result, impacts to air quality should be minor and short in duration.

f) **Noxious Weeds**-Equipment will be cleaned prior to entering the project area, which will reduce the likelihood of weed seeds being introduced onto treated areas. The DNRC will monitor the project area for two years after harvest and will use an Integrated Weed Management strategy to control weed infestations should they occur.

g) **Forest Conditions and Forest Health-**The proposed harvest will begin the process of returning the timber stands within the project area to those conditions that most likely existed on the site(s) prior to organized fire suppression.

h) **Log Truck Use of Public Roads-**Implementation of the recommended mitigations-i.e. strict adherence to posted speed limits, dust control if necessary and restrictions on the use of compression brakes should minimize the opportunity for conflicts between log trucks, other traffic and/or residences within the project area.

i) **ORV Access-**Construction of earthen barriers across new and existing roads and extensive signing notifying the public that ORV use is not allowed within the project area should address the existing problem of unauthorized ORV use.

j) **Visual Quality**-The limited amount of new permanent roads, a harvest prescription that leaves the largest, healthiest trees within treated stands, and minimizing the width of cable corridors when yarding steeper slopes will result in a minimal visual impact in the short term. The aesthetic quality of the project area should improve in the long term as trees remaining within treated stands increase in size and their crowns expand.

k) **Wildlife-**The proposed harvest operations present a minimal likelihood of negative impacts to Threatened and Endangered Species. Those potential impacts that do exist have been mitigated to levels within acceptable thresholds. The same is true for those species that have been identified as "sensitive" by the DNRC. The effects of the proposed action on Big Game species would be low to moderate due to the closure of 0.5 miles of exiting road and 1.39 miles of new road and the retention of riparian buffers on Timber Creek and the West Fork of Timber Creek.

l) **Economics-**The Action Alternative would provide approximately $300,000 ($200/MBF) in short-term revenue to the Common School Trust and does not limit the DNRC's options for generating revenue from these sites in the future.

3. PRECEDENT SETTING AND CUMULATIVE IMPACTS-

The project area is located on State-owned lands, which are "principally valuable for the timber that is on them or for growing timber or for watershed" (**MCA 77-1-402**). The proposed action is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber harvest is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the identified impacts of the proposed timber sale are within established threshold limits. Proposed timber sale activities are common practices and none of the project activities are being conducted on fragile or unique sites.

The proposed timber sale conforms to the management philosophy adopted by DNRC in the SFLMP and is in compliance with existing laws, Administrative Rules, and standards applicable to this type of action.

4. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

a) The EA adequately addressed the issues identified during project development, and displayed the information needed to make the pertinent decisions.

b) Evaluation of the potential impacts of the proposed timber sale indicates that significant impacts to the human environment will not occur as a result of the implementation of the Action Alternative.

c) The ID Team provided sufficient opportunities for public review and comment during project development and analysis.

Jonathan E. Hansen
Missoula Unit Manager
April 23, 2007

Timber Creek Timber Sale

Cover Sheet

Proposed Action: The Montana Department of Natural Resources and Conservation (DNRC), proposes the harvest of timber on state School Trust Lands. The sale under consideration would harvest approximately 1.5 million board feet of timber from approximately 243 acres in Section 16 T19N R30W (Figure 1.1). The proposed action would be implemented as early as July 2007 and could be completed by June 2009. Slash work and burning associated with the sale may not be completed until 2010. These dates are approximate.

Type of document: Environmental Assessment

Lead agency: Montana Department of Natural Resources and Conservation (DNRC)

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Special Note: Comments received in response to this Environmental Assessment will be available for public inspection and will be released in their entirety, if requested, pursuant to the Montana Constitution.

How to Read this EA (Environmental Assessment)

To read this EA more effectively, carefully study this page. Following State regulations, we have designed and written this EA (1) **to provide** the Project Decision Maker with sufficient information to make an informed, reasoned decision concerning the proposed Timber Creek Timber Sale and (2) **to inform** members of the affected and interested public of this project so that they may express their opinions to the Project Decision Maker.

This EA follows the organization and content established by the Environmental Quality Council (EQC) Regulations (ARM 36.2.521-36.2.543). This EA consists of the following chapters.

1.0 Purpose and Need for Action
2.0 Alternatives, Including the Proposed Action
3.0 Affected Environment
4.0 Environmental Consequences
5.0 List of Preparers
6.0 List of Agencies and Persons Consulted
7.0 References
8.0 Appendix

Chapters 1 and 2 together serve as an Executive Summary. We have written these two chapters so that non-technical readers can understand the potential environmental, technical, economic, and social consequences of **taking** and of **not taking** action.

- **Chapter 1** introduces the Timber Creek Timber Sale. It provides a very brief description of the proposed Timber Creek Timber Sale and then explains three key things about the project: (1) the relevant environmental issues, (2) the decisions that the Project Decision Maker must make concerning this project, and (3) the relevant laws, regulations, and consultations with which the DNRC must comply.

- **Chapter 2** serves as the ***heart*** of this EA. It provides detailed descriptions of Alternative A: Deferred Harvest (No Action) and Alternative B: Harvest. Most important, it includes a **summary comparison** of the predicted effects of these two alternatives on the human environment, providing a clear basis for choice between the two alternatives for the Project Decision Maker and the Public.

- **Chapter 3** briefly describes the past and current conditions of the relevant resources (*issues*) in the project area that would be meaningfully affected, establishing a part of the baseline used for the comparison of the predicted effects of the alternatives.

- **Chapter 4** presents the detailed, analytic predictions of the consequences of implementing Alternative A and Alternative B. These predictions include the direct, indirect, short term, long term, irreversible, irretrievable, and cumulative effects of implementing the alternative

1.0 Chapter 1: Purpose of and Need for Action

1.1 Proposed Action: Harvest

The Montana Department of Natural Resources and Conservation (DNRC) proposes to harvest timber in the Timber Creek area. The proposed project is located in Section 16, T19N R30W of Mineral County approximately 3 miles northwest of Haugan, Montana (see Figure 1.1). Timber Creek is tributary to the St. Regis River. Under Alternative B: Harvest, the DNRC would harvest approximately 1.5 million board feet of timber from 243 acres. The proposed action would be implemented as early as July 2007 and could be completed by June 2009. Slash work and burning associated with the sale may not be completed until 2010.

1.2 Project Need

The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions. These include public schools, state colleges and universities, and other specific state institutions such as the School for the Deaf and Blind (Enabling Act, February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and Department of Natural Resources and Conservation are required by law to administer these Trust Lands to produce the largest measure of reasonable and legitimate advantage over the long run for these beneficiary institutions (Section 77-1-202, MCA). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (SFLMP). The Land Board approved the implementation of the SFLMP on June 17, 1996. The SFLMP outlines the philosophy of DNRC for the management of state forested Trust Lands.

The Department will manage the lands involved in this project according to the philosophy in the SFLMP, which states the following:

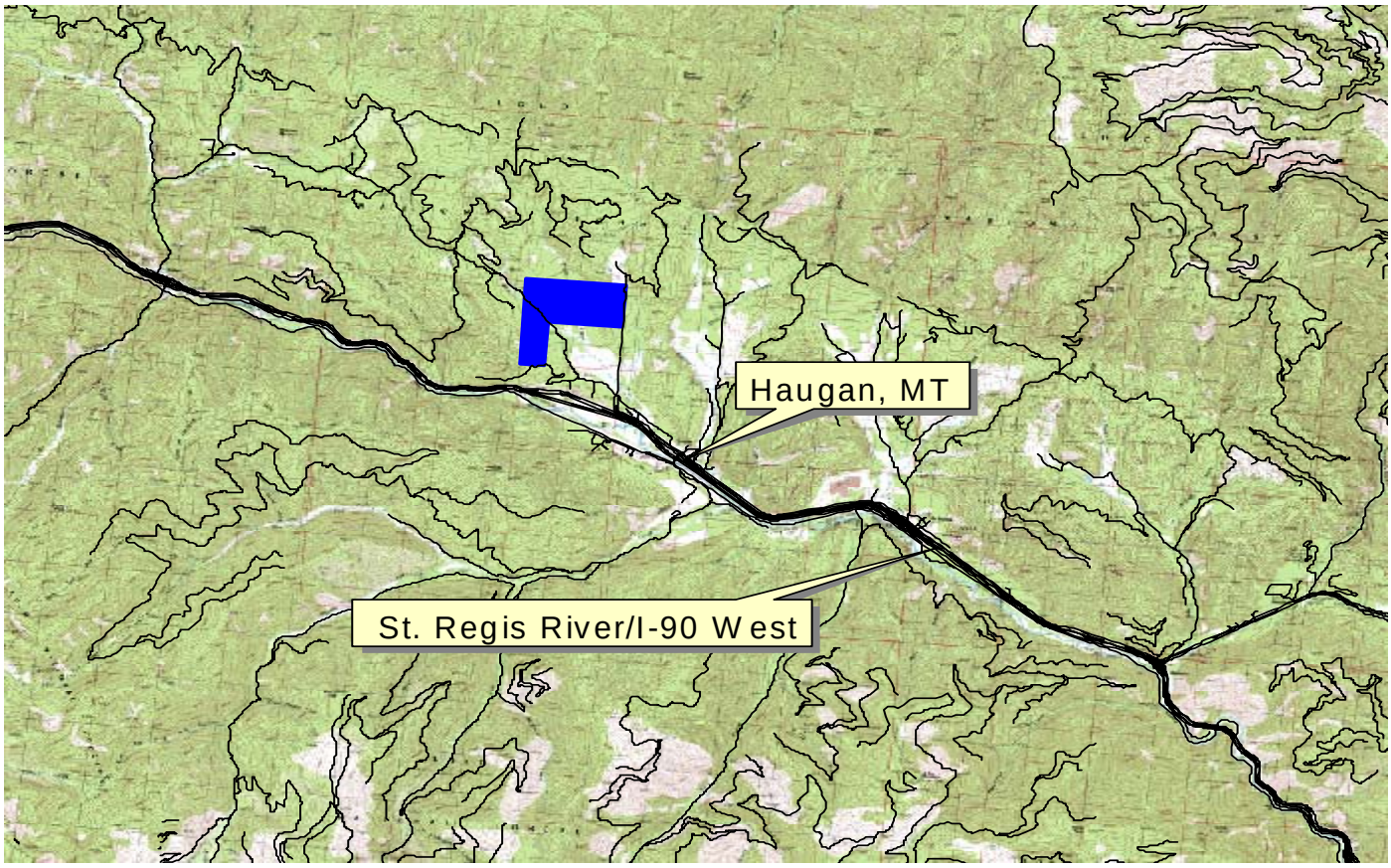
> "Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream. … In the foreseeable future timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives (DNRC, SFLMP Record of Decision 1996 [ROD-1])."

Mountain pine beetle (*dendroctonous ponderosae)* has infected the lodgepole pine dominated stands in the project area, resulting in declining forest health and increased fuel loading. Treatment is necessary to recover the value of dying timber for the trust beneficiary and improve the productivity of these stands.

Figure 1.1

Timber Creek Project Vicinity

Section 16 T19N R30W



3 0 3 6 Miles

N

Timber Creek Project Area

1.3 Objectives of the Proposed Action (Desired Outcomes and Conditions)

In order to meet the goals of the management philosophy adopted through programmatic review in the SFLMP, the Department has set the following specific project objectives:

- Harvest sufficient timber volume to generate revenue for the Common School (CS) Trust grant.

- Recover the value of lodgepole pine that is dead, dying or threatened by mountain pine beetle.

- Manage the project area for healthy and biologically diverse forests to maximize long term income for the Trust.

1.4 Decisions to be made

The Decision Maker will analyze the project and provide a decision in the Finding at the end of this document. Specifically, the Decision Maker will perform the following:

- Determine if alternatives meet the project objectives.
- Determine which alternative should be selected.
- Determine if the selected alternative would cause significant effect(s) to the human environment, requiring the preparation of an Environmental Impact Statement (EIS).
- Determine the economic and logistical feasibility of the project.

1.5 Relationship to the State Forest Land Management Plan and Rules

The State Forest Land Management Plan (SFLMP) established the agency's philosophy for the management of forested Trust Lands. The management direction provided in the SFLMP comprises the framework for project planning and forest management activities. The plan philosophy and appropriate rules have been incorporated into the design of the proposed action.

The proposed action is limited to specific management activities that are needed to implement the project and provide resource protection. This assessment documents site-specific analysis and is not a general management plan or a programmatic analysis of the area. The scope of this environmental assessment (EA) was determined through DNRC interdisciplinary analysis and public involvement.

1.6 History of the Planning and Scoping Process

Comments from the general public, interest groups, and agency specialists were solicited in 2005. A newspaper article was published in The Mineral Independent in February, 2005. Public notices regarding the proposed sale were posted along roads adjacent to the sale area. Written and/or verbal comments were received from the following individuals and/or organizations: Rex Lincoln, Jeanie Sage, The Ecology Center Inc, Montana Fish Wildlife and Parks and Alliance for the Wild Rockies.

The following resource specialists were involved in the project design, assessment of potential impacts, and development of mitigation measures:

Wayne Lyngholm – DNRC Forester, Missoula Unit
Jeff Rupkalvis – DNRC Supervising Forester, Missoula Unit
Jon Hansen – DNRC Missoula Unit Manager
Jeff Collins – DNRC Hydrologist/Soil Scientist, Southwest Land Office
Mike McGrath – DNRC Wildlife Biologist, Southwest Land Office
Pat Rennie – DNRC Archeologist, Agriculture and Grazing Management Bureau, Helena.

1.7 Other Environmental Assessments (EA's) Related to this Project

Removal of material from the state gravel pit for road improvements is addressed in a separate EA.

1.8 Permits, Licenses, and Other Authorizations Required

Reconstruction of a temporary bridge across the West Fork of Timber Creek would require 124 permit authorization from the Montana Department of Fish, Wildlife and Parks. An approach from county maintained road to proposed road construction requires authorization from planning and road departments of Mineral County.

1.9 Issues and Concerns

Communication within the Interdisciplinary Team (IDT) and comments received through scoping were used to identify issues related to the project. A summary of these concerns is presented below.

- Lodgepole pine mortality would continue in the absence of treatment, resulting in lost revenue to the trust and increased fire hazard.

- Stand productivity and tree vigor would continue to decline in the absence of treatment, reducing long-term benefit to the trust.

- Slash from timber harvest activities could increase fire hazard and temporarily reduce the aesthetic quality of the site.

- Equipment operation could temporarily impact the aesthetic quality of adjacent residences and potentially create a fire hazard.

- Equipment and log truck operation could interfere with snowmobile recreation on groomed trails.

- Log trucks could create noise, dust and threaten public safety on roads.

- The proposed project could spread noxious weeds.

- Increased soil compaction and erosion could occur as a result of the proposed project.

- The proposed project could have a direct effect on water quality, cold-water fisheries and fish habitat.

- The proposed project could impact species classified as threatened and endangered including Canada lynx, Grizzly bears, Gray Wolves and Bald Eagles.

- The proposed project could impact species classified as sensitive including Flammulated Owls, Pileated Woodpeckers, Fishers, Black-backed Woodpeckers, Peregrine Falcons, Townsend's Big-eared Bats, Coeur d'Alene Salamanders, Columbian Sharp-tailed Grouse, Common Loons, Harlequin Ducks, Mountain Plovers and Northern Bog Lemmings.

- The proposed project could impact other protected species including Northern Goshawks.

- The proposed project could impact big game including White-tailed deer, Elk and Moose.

- Cultural or archeological sites may exist on the site that could be altered by the proposed project.

- Use of Off Road Vehicles (ORV's) is occurring off road and on roads closed to motorized vehicles in the project area and could increase as a result of new road construction.

- Timber harvest could create stand conditions differing from those that existed historically.

1.9.1 Issues Studied in Detail

1.9.1.1 Geology/Soil Resources

The proposed management activities could adversely effect geologic or soil resources through displacement or compaction. Equipment operations and timber harvest on wet sites or sensitive soils could result in soil impacts that effect soil productivity depending on the area and degree of soil impacts.

1.9.1.2 Water Quality

Land management activities such as timber harvest and road construction could impact water quality primarily by accelerating sediment delivery to local stream channels and draw bottoms. These impacts are caused by erosion from road surfaces, skid trails, log landings and by the removal of vegetation along stream channels.

1.9.1.3 Cumulative Watershed Effects

Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of disturbances, both human-caused and natural. Timber harvest activities can affect the timing of runoff, increase peak flows and increase the total annual water yield of a particular drainage.

1.9.1.4 Cold Water Fisheries

Land management activities such as timber harvest and road construction can impact fish habitat primarily by accelerating sediment delivery to local stream channels and by decreasing large woody debris recruitment through the removal of trees near the stream channel.

1.9.1.5 Noxious Weeds

Following disturbance events such as timber harvest activities, invasion and spread of noxious weeds is more prevalent than in undisturbed areas. Noxious weed invasion and spread negatively influences surface cover, erosion and native species.

1.9.1.6 Forest Conditions and Forest Health

Timber harvest activities could produce stand conditions (e.g. structure and species composition) that differ from historic conditions. Conversely, forest productivity and individual tree health would continue to decline in the absence of treatment. Lodgepole pine mortality could accelerate due to increasing mountain pine beetle infestation, resulting in heavy dead fuel accumulation.

1.9.1.7 Heavy Truck Traffic and Public Safety

Log hauling on public roads could create dust, noise and may pose a traffic safety hazard.

1.9.1.8 ORV access

Construction of new roads and removal of natural barriers (trees and logs) could allow increased occurrence of ORV (four wheelers and motorcycles) use in areas closed to motorized vehicles.

1.9.1.9 Visual Quality

Timber harvesting and road construction associated with the proposed action could adversely affect the aesthetic value of this area. Roads, skid trails, skyline yarding corridors and canopy openings may appear unnatural from a distance. Untreated logging slash, damaged trees, stumps, skid trails, uniform thinning and canopy cover reduction may detract from the natural appearance associated with un-managed forests.

1.9.1.10 Economic Benefits and Project Revenue

Concern has been raised that the proposed project might not be economically viable.

1.9.1.11 Fire Hazard

Operation of logging equipment and logging slash production could increase the risk of wildfire. Conversely, the continued mortality of dense lodgepole pine stands could create hazardous dead fuel accumulations.

1.9.1.12 Endangered Species

1.9.1.12.1 Grizzly Bears

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to grizzly bears.

1.9.1.12.2 Canada Lynx

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to lynx.

1.9.1.12.3 Gray Wolves

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to gray wolves.

1.9.1.13 Sensitive Species

1.9.1.13.1 Flammulated Owls

Timber harvesting could alter habitat or create disturbance that could be detrimental to the Flammulated owl.

1.9.1.13.2 Pileated Woodpeckers

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to pileated woodpeckers.

1.9.1.13.3. Fishers

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to fishers.

1.9.1.14 Big Game

1.9.1.14.1 White-tailed Deer and Elk

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to white-tailed deer and elk summer range.

1.9.1.14.2 Moose

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to moose winter range.

1.9.1.15 Other Species

1.9.1.15.1 Northern Goshawk

Timber harvest and associated activities could alter habitat or create disturbance that could be detrimental to northern goshawks.

1.9.2 Issues Eliminated from Further Study

1.9.2.1 Endangered Species

1.9.2.1.1 Bald Eagles

There is concern that the proposed action and resulting habitat alterations could create conditions that are detrimental to bald eagles. Bald eagles typically nest and roost in large diameter trees within 1 mile of open water. They are sensitive to a variety of human caused disturbances, ranging from residential activities to resource use and heavy

equipment operation, among others (Montana Bald Eagle Working Group 1994). Bald eagle response to such activities may range from spatial and temporal avoidance of disturbance activities to total reproductive failure and abandonment of breeding areas (MBEWG 1994). While foraging, they typically perch within 500 m of shoreline habitat (Mersmann 1989); and roost in trees ranging in diameter from 12 to 39 inches and 49 to 200 feet in height (Stalmaster 1987). The nearest known bald eagle territories are located approximately 17 miles northeast of the project area. Due to the distance involved, there would be minimal risk of direct, indirect, and cumulative effects to this species as a result of the proposed action.

1.9.2.2 Sensitive Species

1.9.2.2.1 Black-backed Woodpecker

There is concern that timber harvest activities would disturb black-backed woodpeckers. This species is most often associated with areas that recently experienced stand-replacing fire (Hutto 1995). There are no recently burned areas near the project area. As a result, the proposed action would likely have low risk of direct, indirect, or cumulative effects to this species due to a lack of potentially suitable habitat in close proximity to the project area.

1.9.2.2.2 Peregrine Falcon

There is concern that timber harvest activities would disturb nesting peregrine falcons. The nearest known peregrine falcon nest is located approximately 32 miles east of the project area. Thus, the proposed action would have minimal risk of direct, indirect, or cumulative effects to this species.

1.9.2.2.3 Townsend's Big-eared Bat

Townsend's big-eared bats occur in a wide variety of habitats, yet its distribution tends to be strongly correlated with the availability of caves and old mines for roosting habitat. Population concentrations occur in areas with substantial surface exposures of cavity forming rock, and in old mining districts (Pierson et al. 1999). This species is primarily a cave dwelling species that also roosts in old mine workings. It is a relatively non-migratory bat, for which no long-distance migrations have been reported. The Townsend's big-eared bat does not generally associate with other species in its roosts, particularly at maternity and hibernating sites. The generally accepted mitigations for this species (e.g., Pierson et al. 1999) recommend a 500 ft radius buffer around mine and cave entrances to minimize disturbance around roost sites. Much of the mining activity in which adits or mine shafts are used occur >0.75 mile from the project area. As a result, there would be low risk of direct, indirect, or cumulative effects to this species as a result of the proposed action.

1.9.2.2.4 Coeur d'Alene Salamander

There is concern that timber harvest activities could affect this species. This species requires waterfall spray zones, talus, or cascading streams. There are no known areas of talus, waterfalls, or splash zones within the affected area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.9.2.2.5 Columbian Sharp-tailed Grouse

There is concern that timber harvest activities could affect this species. The nearest known population of Columbian Sharp-tailed grouse occurs near Ovando, MT. Because of the distance involved, the proposed action would likely have low risk of direct, indirect, or cumulative effects to this species.

1.9.2.2.6 Common Loon

The common loon is a fish-eating bird that breeds and nests on lakes and ponds. The nearest known observation for common loons is on Flathead Lake (Montana Natural Heritage Database). Thus, this area is not connected through the stream network with the proposed project area. Therefore, there is a low risk of direct, indirect, or cumulative effects to common loons as a result of the proposed project and this species will not be analyzed further in this document.

1.9.2.2.7 Harlequin Duck

Harlequin ducks require white-water streams with boulder and cobble substrates, as well as dense riparian vegetation. Such conditions do not exist within, or downstream of the analysis area. Thus, there would be low risk of direct, indirect, or cumulative effects to this species.

1.9.2.2.8 Mountain Plover

The short-grass prairie habitats, or heavily grazed taller grass prairie habitats, required by this species are not present within the harvest area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.9.2.2.9 Northern Bog Lemming

The sphagnum meadows, bogs or fens with thick moss mats required by this species are not present within the harvest area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

2.0 Alternatives Including the Proposed Action

2.1 Introduction

Chapter 2 describes the alternatives developed and considered in this EA. Summaries and comparisons are included for the activities associated with each alternative. The potential environmental consequences of these activities are included for comparison. Information regarding alternatives is presented in greater detail in chapters 3 and 4.

2.2 Development of Alternatives

2.2.1 History and Process Used to Formulate Alternatives

Public scoping was initiated in December of 2004. Three written responses to scoping were received from external parties (Rex Lincoln, Montana FWP and The Ecology Center) and the project leader held discussions with individual adjacent landowners. In July of 2006, a DNRC Interdisciplinary Team (IDT) began project area analysis and internal review to develop a management plan. Scoping response and IDT input identified issues and shaped alternatives. Issues identified during the scoping process are summarized in Chapter 1. The Action Alternative was developed to address relevant issues and meet the requirements of the Administrative Rules for Forest Management and the Trust Land Mandate.

2.2.2 Selection Criteria

The DNRC IDT identified the following design and evaluation criteria:

- Compliance with the/ State of Montana Trust Land Mandate
- Compliance with the Montana Environmental Policy Act (MEPA)
- Compliance with the Montana Administrative Rules for Forest Management and Montana Streamside Management Zone (SMZ) Law
- Compliance with the Endangered Species Act (ESA)
- Compliance with all other applicable Federal and State of Montana Laws and Regulations.

2.3 Description of Alternatives

Alternative B: Harvest was developed to address relevant issues, comply with applicable regulations, provide effective mitigation for potential impacts and achieve project objectives. Consequently, only the Harvest and No Action alternatives will be considered within this document.

2.3.1 Alternative A: Deferred Harvest (No Action)

Activities associated with Alternative B: Harvest would not occur on the project area at this time. No revenue would be generated for the Common School Trust for the specific lands included within the project area. DNRC approved activities would continue in the project area. Lodgepole pine mortality would likely continue, resulting in lost revenue to the trust, non-compliance with the trust mandate and continued accumulation of hazardous fuels.

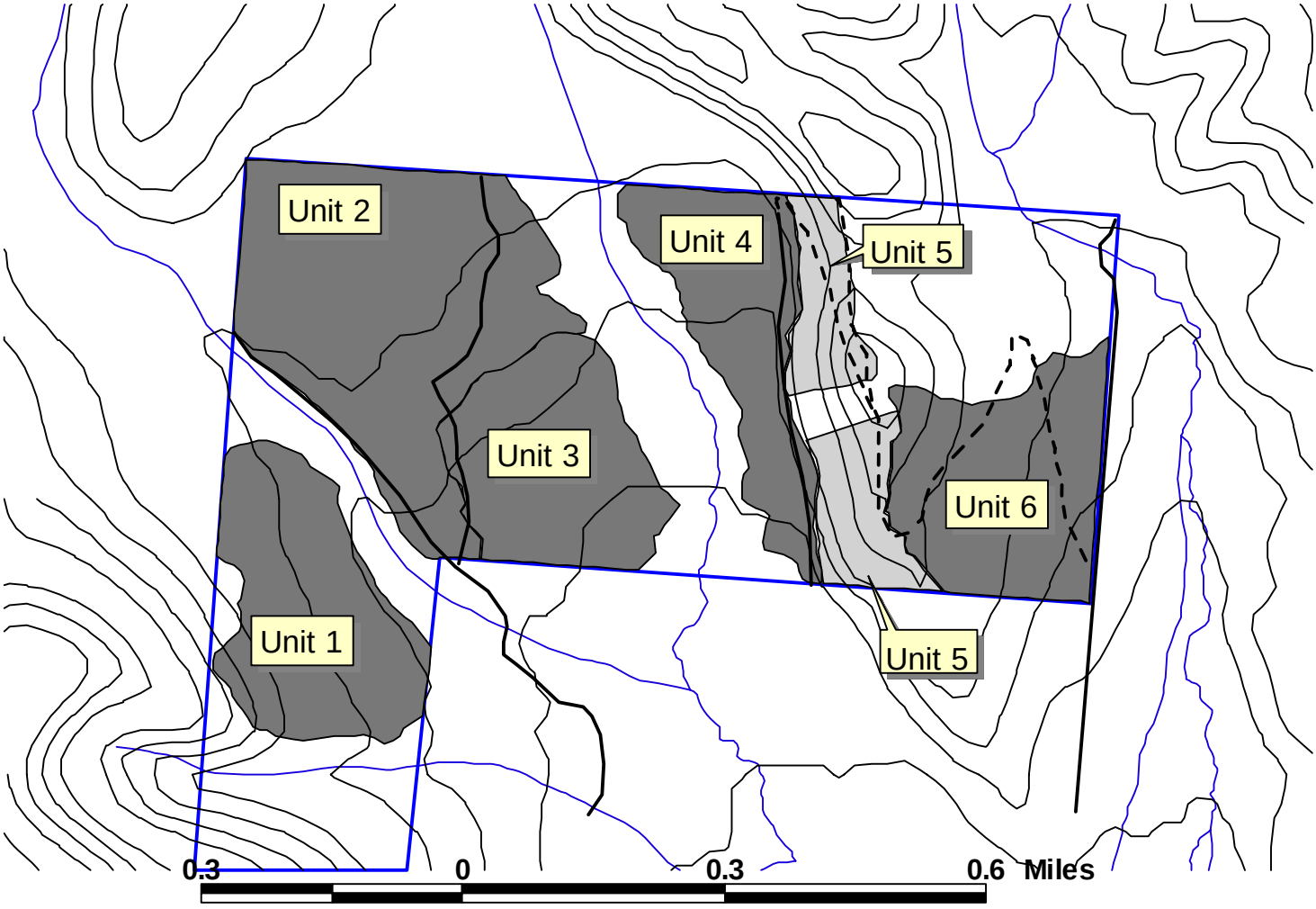
2.3.2 Alternative B: Harvest

The proposed harvest would include removal of approximately 1.1 MMBF (million board feet) of dead, dying and threatened lodgepole pine from approximately 220 acres through a combination of Individual Tree Selection and Overstory Removal prescriptions (Figure 2.1: Alternative B: Harvest). The vast majority of existing mature western larch, western white pine, Douglas-fir and ponderosa pine would be retained, as well as the established advanced regeneration that currently occupies the understory. 23 acres of overstocked Douglas-fir and ponderosa pine stands would be commercially thinned to reduce competition and improve stand productivity (Figure 2.1: Alternative B: Harvest). This thinning would remove approximately 400 MBF (thousand board feet) of sawlogs. Slash would be processed in the woods or return skidded from the landings to facilitate nutrient cycling. Protection of established regeneration and healthy retention trees from equipment damage would be a priority.

Approximately 1.39 miles of new road construction would provide permanent access to the east half of the section. Approximately 1 mile of existing road would be improved to meet Best Management Practices (BMP) standards for forest roads in conjunction with the implementation of Alternative B: Harvest. A temporary bridge would be installed on an existing site on the West Fork of Timber Creek. 2.39 miles of roads would be posted and closed to motor vehicles with earthen and vegetative barriers upon completion of the sale. Planting of western larch and western white pine seedlings and weed spraying may occur after harvest to achieve forest improvement objectives.

Figure 2.1

Alternative B: Harvest



Legend

- Existing roads
- Proposed New Road
- Tractor
- Cable

Unit 1	41 Acres	Tractor/ITS
Unit 2	75 Acres	Tractor/ITS
Unit 3	32 Acres	Tractor/OR
Unit 4	32 Acres	Tractor/ITS
Unit 5	23 Acres	Cable/CT
Unit 6	40 Acres	Tractor/ITS

N

2.4 Mitigation Measures of Alternative B: Harvest

Mitigations are incorporated into project design, as a contract stipulation or may be implemented programmatically. The following discussion will address mitigation actions associated with the project.

2.4.1 Water quality, Soils, Cumulative Watershed Effects and Fisheries Mitigations

2.4.1.1 Harvest Unit Design

- DNRC would locate, mark and maintain suitable water resource protection boundaries including Streamside Management Zones (SMZ's), Riparian Management Zones (RMZ's), and Wetland Management Zones (WMZ's) adjacent to streams and wetlands consistent with State Forest Land Management rules.

- Equipment restriction zones would be established to protect sensitive and moist soils.

- The contractor and sale administrator would agree to a general skidding plan prior to equipment operations.

- Ground based skidding would be limited to slopes of 45% or less.

- Operating season limitations would protect vegetation and prevent rutting and soil compaction by operating equipment on dry (less than 20% moisture content), frozen or snow-covered soils.

- Soil moisture conditions would be monitored prior to equipment operation and throughout the project.

- Contract stipulations would require grass seeding and installation of drainage features and vehicle barriers. Slash would be placed on skid trails to protect soils and reduce erosion potential.

- Retention of 5-15 tons/acre (old and new) coarse woody debris (CWD) greater than 3" inches in diameter would be distributed on site and skid trails for nutrient cycling and erosion control.

2.4.1.2 Road Design and Location

- Forestry BMP's and Montana Administrative Rules for Forest Management would be the minimum standard for all operations with the proposed timber sale.

- Existing road segments would be improved and maintained in association with the harvest activities.

- Road improvements would include installation of drainage features to prevent surface erosion and sediment delivery to streams, ditching to improve road surface stability and surface blading.

- New roads would be closed to motor vehicles upon completion of harvest activities.

- Newly constructed or reconstructed road cuts, fills and disturbed soils would be grass seeded immediately after excavation.

- Road ditches with direct delivery to streams or ephemeral draws would be filtered at the ditch outlet by using slash or filter fabric and straw bales.

2.4.1.3 Temporary Bridge Design and Installation

- Filter fabric fence or appropriate erosion control would be installed between fill and stream banks.

- Bridge pad and installation would meet the requirements of the FWP 124 permit issued for this project for stream protection.

2.4.2 Noxious Weed Mitigations

- All road construction and harvest equipment would be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds.

- Equipment would be subject to inspection by the Forest Officer prior to moving on-site.

- Newly constructed or reconstructed road cuts, fills and disturbed soils would be grass seeded immediately after excavation.

2.4.3 Forest Conditions and Forest Health Mitigations

- Predominant natural disturbance regimes are required programmatically (ARM 36.11.408) to be the basis for determining silvicultural systems and associated treatment prescriptions.

- Treatments would be designed to achieve the appropriate stand cover types defined by The DNRC Stand Level Inventory (DNRC SLI 2004) as required by ARM 36.11.405.

2.4.4 Heavy Truck Traffic and Public Safety Mitigations

- Posted truck speed limits in residential areas would be 25 mph.
- As a contract stipulation, dust control would be applied near residences on unpaved roads.
- As a contract stipulation, compression brake use near residences would be prohibited.

2.4.5 ORV Access Mitigations

- Earthen barriers would be constructed across new road and existing road segments.
- Signs would display road closure restrictions where roads enter the project area.

2.4.6 Visual Quality Mitigations

- As a contract stipulation, all species other than lodgepole pine would be retained in Individual Tree Selection (ITS) harvest units.
- Retention tree canopy would effectively hide skyline corridors and roads in cable harvest units.

2.4.7 Wildlife Mitigations

2.4.7.1 General Wildlife Mitigations

- If active den sites or nest sites of threatened, endangered, sensitive species, or raptors were located within the Project Area, activities would cease until a DNRC wildlife biologist could review the site and develop species appropriate protective measures.
- ORV access within the Project Area would be restricted to minimize wildlife disturbance, incidental affects to important habitat features such as snags and downed woody debris, to reduce potential mortality effects on threatened, endangered, and sensitive species, and to reduce big game harvest vulnerability.
- Motorized vehicle restrictions would be maintained and earthen and slash vehicle barriers installed.

2.4.7.2 Gray Wolf Mitigations

- 0.5 mile of existing road would be effectively closed.
- Approximately 1.39 miles of proposed new road would be effectively closed after harvest operations cease.

- Riparian buffers of 75 feet or greater would be retained on Timber Creek and the West Fork Timber Creek.

2.4.7.3 Grizzly Bear Mitigations

- Effective closure of approximately 0.5 mile of existing road.

- Approximately 1.39 miles of proposed new road would be effectively closed after harvest operations cease.

- Retention of riparian buffers on Timber Creek and West Fork Timber Creek (minimum 75 ft width).

2.4.7.4 Canada Lynx Mitigations

- Riparian buffers would be retained on Timber Creek and West Fork Timber Creek (minimum 75 ft width).

- Snag recruits would be clustered within 1 tree length of riparian buffers to provide future prey habitat.

2.4.7.5 Northern Goshawk Mitigations

- Retention of riparian buffers on Timber Creek and West Fork Timber Creek (minimum 75 ft width).

- Cluster snag recruits within 1 tree length of riparian buffers to provide future nesting and foraging habitat.

2.4.7.6 Big Game (White-tailed Deer, Elk and Moose) Mitigations

- Effective closure of approximately 0.5 mile of existing road.

- Effective closure of approximately 1.39 miles of proposed road post-harvest.

- Retention of riparian buffers on Timber Creek and West Fork Timber Creek (minimum 75 ft width).

2.4.8 Fire Hazard Mitigations

- During periods of high fire danger, timber harvest may be halted or allowed with night-time operating restrictions.

- Equipment and operators would be required to possess and maintain fire suppression equipment during periods of high fire danger.

2.5 Description of Relevant Past, Present, and Reasonably Foreseeable Future DNRC Activities Not Part of the Proposed Action.

2.5.1 Past Relevant Actions

2.5.1.1 Timber Management

Approximately 200 acres within the project area were commercially thinned in 1996. Approximately 1.5 miles of temporary roads were constructed and rehabilitated in conjunction with this project.

2.5.2 Present Relevant Actions

2.5.2.1 Recreation

Motorized and non-motorized recreation occurs in the project area. ORV's commonly operate on gated closed roads and off road. Snowmobile riding occurs on groomed public roads in the vicinity.

2.5.3 Future Relevant Actions

2.5.3.1 Timber Management

Pre-commercial thinning would be appropriate within a decade of the completion of harvest activities to reduce competition, select for desirable species and reduce understory fuel accumulation. Firewood cutting would likely continue in the absence of harvest. Commercial timber harvest could likely occur within 10-30 years.

2.5.3.2 Recreation

Barriers and signs would be installed to manage illegal ORV use behind locked gates. Snowmobiling and non-motorized recreation would continue.

2.5.3.3 Road Management

DNRC administered roads in the project area would be maintained to comply with current BMP's.

2.6 Summary Comparison of Activities, the Predicted Achievement of the Project Objectives, and the Predicted Environmental Effects of All Alternatives

2.6.1 Summary Comparison of Activities

The following table provides a comparison of activities associated with each alternative.

Table 2.1 Summary Comparison of Activities		
Activity	**Alt. A: No Action**	**Alt. B: Harvest**
Estimated Harvest Volume (million board feet)	0	1.5
Estimated Gross Revenue to the State (est. stumpage rate of $200/mbf + Forest Improvement Income of $16.27/mbf)	0	$324,405
Estimated Net Revenue to the Common School Trust (est. stumpage rate of $200/mbf)	0	$300,000
Estimated Forest Improvement Income ($16.27/mbf)	0	$24,405
Acres of Project Area Lodgepole Pine Stands Treated	0	215(77%)
Total Acres within Project Area	400	400
Total Project Area Acres Treated	0	248(62%)
Individual Tree Selection Prescription (acres)	0	188
Overstory Removal Prescription (acres)	0	37
Commercial Thin Prescription (acres)	0	23
Tractor Yarding (acres)	0	225
Cable Yarding (acres)	0	23
New Road Construction (miles)	0	1.39
Open Roads (miles)	1.4	.9
Closed Roads (miles)	.5	2.5

2.6.2 Predicted Achievement of Project Objectives

By design, Alternative B: Harvest would meet the project objectives. Approximately $315,000 of gross revenue would be generated to benefit the Common Schools trust as required by the trust mandate. Dead, infected and threatened lodgepole pine would be removed from 215 acres. 23 acres of overstocked mature Douglas-fir would be thinned to reduce competition. The alternative would apply natural disturbance emulating prescriptions to achieve desired future stand conditions. Treatment would favor an appropriate mix of stand structures and maintain stand productivity.

The following table provides a summary of predicted achievement of project objectives by alternatives.

Table 2.2 Predicted Attainment of Project Objectives			
Project Objective	**Indicator of Attainment**	**Alternative A: Deferred Harvest (No Action)**	**Alternative B: Harvest**
Harvest sufficient timber volume to generate revenue for the Common School (CS) trust grant.	Volume to be Harvested.	No saw timber would be harvested to generate revenue for the Common Schools Trust.	Approximately 1.5 million board feet of saw timber would be harvested to generate revenue
Recover the value of lodgepole pine that is dead, dying or threatened by mountain pine beetle.	Percent of project area lodgepole pine stands treated.	No lodgepole pine stands would be treated.	Approximately 77% of project area lodgepole pine stands would be treated.
Manage the project area for healthy and biologically diverse forests to maximize long term income for the Trust.	Acres to be treated through application of appropriate silvicultural prescription.	No treatment would occur.	Approximately 250 acres would be treated.

2.6.3 Summary Comparison of Predicted Environmental Effects

The following table provides a summary comparison of the predicted effects of alternatives.

Table 2.3 Summary Comparison of Predicted Effects of Alternatives		
Issue	Alternative A-Deferred Harvest (No Action)	Alternative B-Harvest
Soil Resources	Minimal effects on soil resources. Existing roads would require routine maintenance to help reduce potential future impacts.	Harvest mitigation measures (e.g., skid trail planning and limits on season of use) would limit soil impacts to 15% or less of harvest area. Retention of coarse woody debris would facilitate long term nutrient cycling, maintain long-term soil productivity and reduce on-site erosion. Low risk of direct, indirect or cumulative impacts to soil resources.
Water Quality	Minimal effects on water quality. Wildfire hazard associated with stand level lodgepole pine mortality could ultimately cause water quality impacts in the absence of harvest.	Harvest activities and road construction are not expected to increase sediment yield to stream channels through implementation of BMP's mitigations. Low risk of impacts to water quality or downstream beneficial uses.
Cumulative Watershed Effects	No change from current condition. Slight water yield increase could occur from continued lodgepole pine mortality.	The action alternative presents low risk of cumulative effects from increased water yield or sedimentation. Erosion control and site specific mitigation measures would prevent long-term impacts to downstream water quality or beneficial uses.

Issue	Alternative A: Deferred Harvest (No Action)	Alternative B: Harvest
Cold Water Fisheries	No effects to fisheries are predicted under the Alternative A: Deferred Harvest (No Action)	Low risk of changes in stream function, sedimentation or temperature impacts to fish habitat based on implementation of the SMZ Law and Forest Management Administrative Rules, Best Management Practices and site-specific mitigations.
Noxious Weeds	Gradual increase in weed density over time. Integrated weed management efforts would continue on the site.	Potential increase in noxious weed density and occurrence compared to the Alternative A: Deferred Harvest (No Action) due to soil disturbance and decreased tree canopy. Integrated weed management efforts would continue on the site. Control efforts would emphasize treatment of any new noxious weeds.
Forest Conditions	Lodgepole pine mortality would likely increase due to an epidemic population of mountain pine beetle. Dead fuel accumulation could increase potential risk of stand replacing fire and hazard to adjacent property	Harvesting would move the stands closer to pre-settlement conditions dominated by seral species and promote recruitment of western larch and western white pine. Growth rates and health of trees would improve due to a reduction in stocking levels
Heavy Truck traffic and public safety	No change from current condition.	Dust level may be reduced through dust abatement adjacent to homes. Log truck traffic may create a temporary noise disturbance and safety hazard to adjacent residents.

Issue	Alternative A: Deferred Harvest (No Action)	Alternative B: Harvest
Visual Quality	No change from current state. Increased potential for stand replacement wildfire.	Treated stands would have a more open appearance. Steeper slopes that are visible from a distance would have a mottled green and white appearance in the winter in contrast to their solid green appearance now. Retention trees would mostly obscure new roads. Skid trails, slash and stumps may create a short term negative impact.
Fire Hazard	Dead fuel accumulation would likely increase in conjunction with ladder fuel development in the understory.	Temporary low to moderate risk of fire hazard due to equipment ignition sources and slash production. Fire hazard would be reduced in the long term by removing dead standing fuel accumulations.
Endangered Species		
Canada Lynx	No change from current condition would be expected.	Low risk of direct, indirect and cumulative effects to Canada lynx from the proposed action.
Grizzly Bear	No change from current condition would be expected.	Low risk of direct, indirect and cumulative effects to Grizzly Bears from the proposed action.
Gray Wolf	No change from current condition would be expected.	Low risk of direct, indirect and cumulative effects to wolves from the proposed action.
Sensitive Species		
Flammulated Owl	No change from current condition would be expected.	Low risk of direct, indirect and cumulative effects to faulted owls from the proposed action.

Issue	Alternative A: Deferred Harvest (No Action)	Alternative B: Harvest
Pileated woodpecker	No change from current condition would be expected.	Low to moderate risk of direct, indirect and cumulative effects to pileated woodpeckers from the proposed action.
Fisher	No Change from current condition would be expected.	Low risk of direct, indirect and cumulative effects to fishers from the proposed action.
Big Game		
White-tailed deer and Elk	No change from current condition would be expected.	Low risk of direct, indirect and cumulative effects to deer and elk summer range habitat from the proposed action.
Moose	No change from current condition would be expected	Low risk of direct, indirect and cumulative effects to moose winter range habitat from the proposed action.
Other Species		
Northern Goshawk	No change from current condition would be expected.	Low to moderate risk of direct, indirect and cumulative effects from the proposed action.

3.0 Affected Environment

3.1 Introduction

Chapter 3: Existing Conditions describes the relevant resources that would affect or be affected by the alternatives if they were implemented. This chapter also describes the existing environment and includes effects of past and ongoing management activities within the analysis area that might affect project implementation and operation.

In conjunction with the description of the Alternative A: Deferred Harvest (No Action) in Chapter 2 and with the predicted effects of the alternatives, the public can compare the effects of Alternative B: Harvest.

3.2 Description of Relevant Resources

3.2.1 Geology & Soils

The proposed harvest is located in the Timber Creek alluvial valley and foothills above the St. Regis River. Primary parent materials are deep alluvium, Lake Missoula sediments and glacial tills derived from Belt series, limestone bedrock. The majority of the project area is located on mainly moderate slopes of 4-35% with lesser areas of 35 to 60%. No unstable or unique geology occurs on the project area. Shallow bedrock may occur on steeper slopes in the northwest, but should be ripable and not restrict road construction.

Primary soils are Savenac silt loams forming the gently rolling terraces in the center of section bounded by Drexel shaly silt loams, Holloway stony loams and included areas of Craddock soils, on the foot slopes (as referenced in StRegis-Ninemile Soil Survey and DNRC review). Savenac soils have a reddish brown, volcanic ash silt loam surface, over deep silty clay subsoils from mixed glacial Lake Missoula and alluvial sediments. Savenac soils in this area have a higher content of gravels and cobbles than typical. These soils have poor bearing strength and are susceptible to compaction and rutting if operated on when wet, but are suitable for ground based equipment operations if dry or frozen. Erosivity is moderate and increases to high on steeper slopes. Erosion can be effectively controlled with standard drainage practices. Soil displacement and compaction hazards are moderate for harvest operations and can be mitigated by limiting disturbance and season of use. Unsurfaced roads are prone to rutting if operated on when wet. These soils are productive, supporting lodgepole, Douglas fir, larch and white pine.

Drexel and Craddock soils are well drained, deep shaly silt loam subsoils. Craddock and Holloway soils have a volcanic ash surface and are more productive than Drexel soils, which occur on drier sites and have little or no ash surface. Primary concerns are compaction and displacement. These limitations can be overcome by limiting operations to dry, frozen or snow conditions. Drexel and Holloway soils have the longest season of use. Predominate slopes of 10-45% are well suited to ground based skidding operations. Skidding on slopes over 40% are at higher risk of soil displacement and erosion. Deeper

soils in swales and riparian areas supporting aspen remain wet later in the spring and are prone to rutting if operated on when wet. Relatively dry or frozen soils are resistant to rutting and compaction.
A previous commercial thinning harvest in 1996 used well placed skid trails and season of use limitations consistent with Best Management Practices. Operations occurred on 20% of the area within the harvest units and soil impacts are estimated to be 10% or less of the area based on field review of the harvest units and previous monitoring (Collins 2004). No previous harvest effects have occurred in the proposed cable harvest areas. No eroded trails or BMP departures were noted and large woody debris is well dispersed across the area from the previous harvest.

3.2.2 Water Quality and Effected Watershed

3.2.2.1 Existing Conditions

The watershed analysis area for this project includes the Timber Creek drainage that supports a mixed forest of lodgepole pine, Douglas-fir, ponderosa pine, western white pine and spruce.
The proposed Timber Creek Timber Sale project is located on state trust land within Section 16, T19N, R30W of Mineral County (Figure 3.1). The project area is on the foothill slopes in the lower portion of the Timber Creek watershed (HUC 17010204) about 1 mile north of Haugen, Montana. Timber Creek is a 3rd order perennial tributary to the St. Regis River and the Clark Fork River Basin. Timber Creek drains a watershed area of approximately 5,300 acres. The Lolo National Forest owns approximately 75% of the watershed, the State of Montana owns 7%, Plum Creek Timberlands owns 4% and non-industrial private landowners own the remaining 13% of the watershed as forest, range and residences. The main stem stream channel of Timber Creek and the West Fork of Timber Creek are class 1 streams that flow across the DNRC parcel within section 16.

The watershed area also includes several wetlands and springs. Average precipitation ranges from a high of 70 in/yr in the Timber Creek headwaters near Hawk Mountain (elevation 5598 ft) to a low of 24 in/yr on the valley floor near Haugen (elevation 3130 ft.). Within section 16, the average precipitation is moderate at 25 in/yr and elevation range is 3220 to 3600 ft. Precipitation occurs mainly as snow, and spring runoff is not flashy due to moderate stream gradients and slopes.

3.2.2.2 Water Quality Regulations and Uses

The Timber Creek drainage is tributary to the St. Regis River, and is classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.623). Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities. Water quality must also be suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes, and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply (ARM 17.30.623 (1&2)). Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentrations of sediment, (except as permitted in 75-

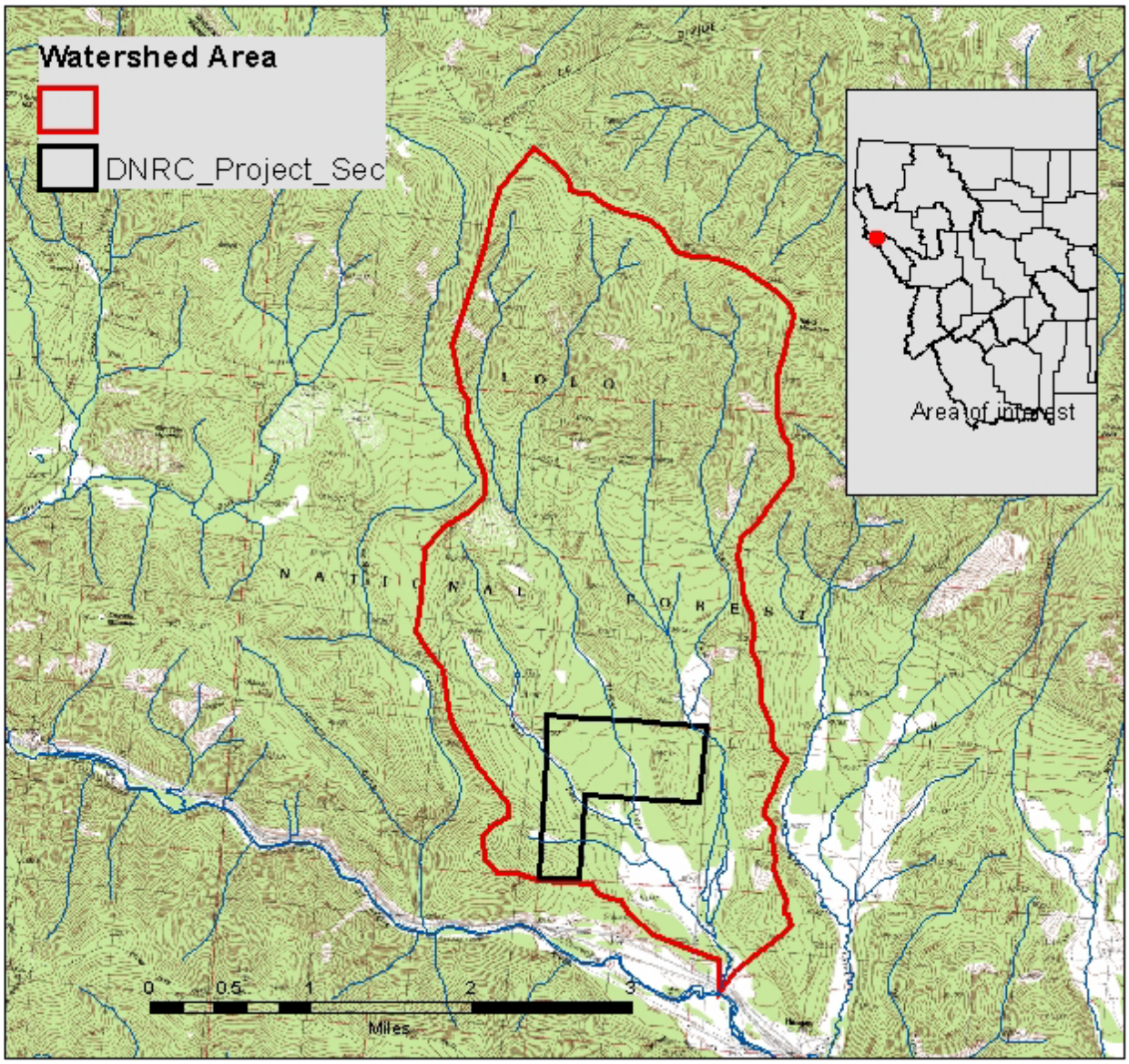
5-318, MCA) which will or are likely to create a nuisance or renders the waters harmful, detrimental or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife (ARM 17.30.623(2)(f)).
Naturally occurring includes resource conditions or materials present from runoff on developed land where all reasonable land, soil, and water conservation practices have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices (BMP's) through its Nonpoint Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities. DNRC provides further protection of water quality and sensitive fish through implementation of the Streamside Management Zone (SMZ) Laws and Forest Management Rules.

Downstream beneficial uses in Timber Creek include: domestic surface water rights, fisheries, irrigation, and livestock watering. Timber Creek is not part of a municipal watershed and fully supports the listed beneficial uses. Timber Creek is not listed as impaired on the State's 303(d) list of impaired bodies of water (MTDEQ 1996 & 2006).

3.2.3 Cumulative Watershed Effects

Cumulative watershed effects are described as impacts on water quality and quantity that result from the interaction of past and current conditions and the proposed management actions. A cumulative watershed effects assessment included the combined past and current effects across all ownerships in the watershed analysis area. Timber harvest and associated activities can affect the timing, distribution and amount of water yield in a watershed. DNRC completed a coarse filter evaluation of watershed conditions, road drainage and cumulative effects as outlined in Forest Management Rules (ARM 36.11.423) concerning watershed management. The coarse filter approach consisted of on-site evaluation, of harvest areas and roads, assessing the extent of past harvest activities, through the use of maps and aerial photographs, and stream channel evaluations. Past management activities in the Timber Creek watershed include timber harvest, mineral exploration, grazing and road construction. The drainage is dominated by mixed lodgepole pine/western larch forests that were initiated by the fires of 1910. Portions of the lower watershed were historically cleared for pasture below the DNRC ownership. From 1980 to1989, about 163 acres were harvested on Lolo National Forest lands and approximately 17 miles of road were constructed in the drainage for timber management and construction of BPA power lines. Based on an analysis of aerial photos the density of existing roads is 2 miles of road per square mile of the watershed analysis area.

Figure 3.1: Watershed Analysis Area



Between 1990 and 1993, the Lolo National Forest completed the Hawk-Packer Timber Sale that included harvest of approximately 286 acres in the Timber Creek watershed. During the same period Plum Creek and other non-industrial private landowners harvested approximately 400 acres in the watershed. Portions of the non-industrial private lands have been subdivided as forested home sites. From 1994-1996, the DNRC commercially thinned 223 acres and removed approximately 50% of the existing crown cover.

In 1990, The Lolo National Forest completed a cumulative watershed effects analysis of the Timber Creek watershed using the WATBAL computer model. The results of that analysis showed only slight increases in average annual water yield (1%), sediment yields

(16%), average annual peak flow (1%) and duration of peak flow (2%) through 1989. DNRC updated that analysis in 1993 to project effects of commercial thinning harvest. Water yield was determined using the Equivalent Clear-cut Acres (ECA) method as outlined in Forest Hydrology part 2 (Haupt et al. 1976). ECA is a function of total area roaded and harvested, % crown cover removal in harvest areas and the amount of vegetative recovery that has occurred in the harvest area. Watershed conditions have had minor change with no substantial timber harvests since 1994. Previously harvested sites have regenerated to conifers and recovered some water yield increases. Subsequent harvests since 1993 have been limited to selective thinning and clearing of approximately 25 acres for home sites on private lands.

Table 3.1 Summary of Existing Watershed Conditions		
	1994	2006
Total Watershed Area (acres)	5232	5232
Existing Water Yield Increase	6%	5.7%
Existing ECA in Watershed	905	855
Watershed in ECA	17%	16%

Stream channel stability ratings were completed at several sites on the main stem of Timber Creek and the West Fork Timber Creek in 1994 and 2005, using the USFS Stream Reach Inventory and Channel Stability Evaluation Procedure (Pfankuch, 1978). All reaches evaluated were rated as good in 1994 and 2005. No evidence of cumulative watershed impacts was observed during field reconnaissance of the project area.

3.2.4 Cold Water Fisheries

Timber Creek supports a known fishery. Species present include brook trout, westslope cutthroat trout (WCT), and bull-trout. A fishery sampling completed in 2002 did not find bull trout in Timber Creek, but bull trout are known to occur in the St. Regis River and are extrapolated to occur in Timber Creek based on connectivity and suitable habitat (MTFWP 2006). The genetic nature of WCT is not known but potentially may include relatively pure genetic strains. Both westslope cutthroat trout and bull trout are considered sensitive species by DNRC.

Timber Creek has good to excellent cold water fish habitat, and fish were observed in Timber Creek during field reconnaissance. No direct sources of sediment from roads were observed in the project area, although some low levels of sediment from existing roads or grazing may occur in the Timber Creek watershed. A trend toward reduced stream shading may be occurring due to lodgepole pine mortality. Wetlands adjacent to stream channels are shaded by mixed brush species. Stream channel stability was evaluated as good on stream segments of Timber Creek and the West Fork Timber Creek in the DNRC parcel.

3.2.5 Noxious Weeds

Noxious weed infestations including spotted knapweed and oxeye daisy occur along portions of the existing access road system and within the section and adjacent lands.

3.2.6 Forest Conditions and Forest Health

The DNRC is committed to maintaining biodiversity by managing for appropriate stand structures and compositions on state lands (ARM 36.11.404). Appropriate stand cover types are determined by the ecological characteristics of the site (habitat type, current stand conditions, climate, disturbance regime, etc.) and estimated historical conditions that existed on the site prior to European settlement. Approximately 20% of stands within the project area currently exist as appropriate cover types as identified by the DNRC Stand Level Inventory (DNRC SLI 2004).

Table 3.2 Cover Type Conditions within the Project Area

Current Cover Type	Appropriate Cover Type (DNRC SLI data, 2004)	Acres	Percent of Forested Project Area
Ponderosa Pine	Ponderosa Pine	29	7.3%
Mixed Conifer	Western White Pine	27	6.8%
Mixed Conifer	Western Larch/Douglas-fir	34	8.5%
Western White Pine	Western White Pine	27	6.8%
Lodgepole Pine	Western White Pine	120	30.2%
Lodgepole Pine	Lodgepole Pine	21	5.3%
Lodgepole Pine	Western Larch/Douglas-fir	100	25.1%
Lodgepole Pine	Ponderosa Pine	39	9.8%
Total		397	99.8 %

The habitat type of stands in the project area all belong to Fire Group 11 with grand fir as the indicated climax species. Fire severity varies in this fuel type due to the moist nature of these forests and variable fuel loading. Historic fire intervals typically ranged from 50-200 years. Heavy fuel loading probably existed historically due to the productive nature of these sites, and diverse forests were generally developed due to the variety of tree species present and their varying response to fire (Fisher and Bradley, 1987).

Stand replacing fires in 1910 initiated the even-aged stands of 80-90-year-old lodgepole pine that currently dominate the site, resulting in a very homogenous age class and canopy structure. Nearly all (90%) of the project area is a single storied forest 80-90 years old and lodgepole pine is the dominant species in 70% of stands (DNRC SLI 2004) Mature Douglas-fir, western larch, ponderosa pine and Englemann spruce occur in varying amounts.

The harvest entry in 1996 commercially thinned approximately 230 acres of the lodgepole pine, with a subsequent decline in stand condition as a result of mountain pine beetle infestation. Advanced regeneration of lodgepole pine, western white pine and

western larch has produced a well-stocked understory. Due to the relatively young age of these stands and the severity of the 1910 fire, old-growth stands have not been identified on this site.

Mixed conifer stands within the project area are very heavily stocked (90-120 square feet of basal area per acre[1]). These stands are in good condition, though growth rates and tree vigor are beginning to decline due to competition for resources. Canopy closure approaches 100% in these stands.

3.2.7 Heavy Truck Traffic and Public Safety

Access to the project area consists of paved and unpaved county and forest service roads in the vicinity of private property and residences. Vehicle traffic from residents as well as motorized recreation on unpaved roads produces significant road dust near homes during dry periods. The Packer Creek Road along the West Fork of Timber Creek is groomed for snowmobile recreation in the winter and snowmobiles share public roads with wheeled vehicles.

3.2.8 ORV Access

Motorized vehicle use is restricted to federal, state, and dedicated county roads or other roads regularly maintained by the county, or to other roads which have been designated open by DNRC. Off road travel is prohibited within Section 16. Snowmobile use is allowed on roads if permitted by local traffic laws or regulations. Extensive ORV trail systems have developed in the project area within the last decade, bypassing DNRC and USFS gates and crossing multiple ownerships. Potential wildlife disturbance, soil erosion and recreation user conflicts occur as a result of these activities.

3.2.9 Visual Quality

Mature forest currently occupies the site, with moderate or full canopy closures on most sites. Mature trees effectively limit visibility from open roads and sight distances within the stand are generally limited to 300 feet. Surrounding topography is typically not visible due to the existing canopy.

Recreational and commuter traffic occurs on open roads throughout the project area. Those using these roads, adjacent homeowners and people recreating on the site generally consider the undisturbed nature of the site desirable. The increasing amount of dead and dying trees may detract from the aesthetic value of the stands.

[1] Basal area is defined as the cross sectional area of a tree stem 4.5 feet above the ground, measured in square feet. When calulated for every tree in a stand, it is commonly used as a relative measure of stand density.

3.2.10 Fire Hazard

The current fuel loading in the project area is approximately 10-20 tons per acre (visual estimate). The current mortality trend for lodgepole pine as a result of mountain pine beetle infection has the potential to create much heavier accumulations of understory dead fuel and standing dead fuel. Additionally, very dense (1000-4000 trees per acre) lodgepole pine and grand fir regeneration exist in the understory in these stands, creating ladder fuels that could carry fire into the overstory. These hazardous conditions occur adjacent to homes in the wildland/urban interface environment of the project area, where high severity stand replacing fires historically took place under similar forest conditions.

Recreation activity and public traffic pose a considerable risk of fire ignition from motorized vehicles, cigarettes and campfires. Dead lodgepole pine in large amounts near public roads has also resulted in significant firewood cutting activity, a potential source of ignition.

3.2.11 Endangered Species

3.2.11.1 Gray Wolves

Wolves north of Highway 12 west of Missoula and north of Interstate 90 were recently re-classified as endangered under the Endangered Species Act. Cover, and road and prey densities likely have some influence on wolves. For cumulative effects analysis, the analysis area encompasses the current extant of the DeBorgia pack's known locations (as of 4 December 2006; using data from http://fwp.mt.gov/wildthings/wolf/wmtreport.html?p=2) as well as nearby mapped winter range for an analysis area of approximately 317 square miles. Open road density within the cumulative effects analysis area is approximately 1.89 miles of open road per square mile (simple linear calculation; approximately 600 miles of open road). Currently, no known wolf den or rendezvous site is located within 1 mile of the project area.

3.2.11.2 Grizzly Bears

Grizzly bears are a listed as a federally threatened species and are the largest terrestrial predators in North America, feasting upon deer, rodents, fish, roots and berries, as well as a wide assortment of vegetation (Hewitt and Robbins 1996). Depending upon climate, abundance of food, and cover distribution, home ranges for male grizzly bears in northwest Montana can range from 60 - 500 mi^2 (Waller and Mace 1997). The search for food drives grizzly bear movement, with bears moving from low elevations in spring to higher elevations in fall, as fruits ripen throughout the year. However, in their pursuit of food, grizzly bears can be negatively impacted through open roads (Kasworm and Manley 1990). Such impacts are manifested through habitat avoidance, poaching, and vehicle collisions.

The project area is approximately 14 miles southwest of the Cabinet Yaak Ecosystem grizzly bear recovery area, which is known to have a small grizzly bear population. The project area is also outside of occupied grizzly bear habitat by approximately the same distance.

Grizzly bears are known to be more vulnerable to human interaction in areas with high open road densities or ineffective road closures. Currently there are 1.57 miles of open road per square mile (simple linear calculation; 390 miles of open road), and 1.84 total miles of road per square mile (458 miles of road), within the 248 square mile analysis area. Within the project area, there are approximately 2.21 miles of open road per square mile (project area is approximately 386 acres), and approximately 3.82 miles of total road per square mile (simple linear calculation).

3.2.11.3 Canada Lynx

Lynx are currently classified as threatened in Montana under the Endangered Species Act. In North America, lynx distribution and abundance is strongly correlated with snowshoe hares, their primary prey. Consequently, lynx foraging habitat follows the predominant snowshoe hare habitat, early- to mid-successional lodgepole pine, subalpine fir, and Engelmann spruce forest. For denning sites, the primary component appears to be large woody debris, in the form of either down logs or root wads (Squires and Laurion 2000, Mowat et al. 2000, Koehler 1990). These den sites may be located in regenerating stands that are >20 years post-disturbance, or in mature conifer stands (Ruediger et al. 2000, Koehler 1990).

Elevations in the project area range from 3,220 to 3,563 feet, and suitable habitat types (Pfister et al. 1977) for potential foraging occur in the area. Snowshoe hares are important lynx prey and are associated with dense young lodgepole pine stands, as well as mature stands with subalpine fir understories. Within the project area, there are approximately 143 acres of mature foraging habitat and approximately 252 acres of lynx habitat identified as "Other". Within the 136 sq. mile cumulative effects analysis area, the State of Montana manages approximately 30 acres, DNRC manages 401 acres, 3,915 acres are in private ownership, 456 acres are industrial forest lands, and 82,266 acres are managed by the USFS**.** Lynx have been sighted and have been known to den within the cumulative effects analysis area (B. Kennedy, USFS Wildlife Biologist, pers. comm., 8 August 2006).

3.2.12 Sensitive Species

3.2.12.1 Flammulated Owls

The flammulated owl is a tiny forest owl that inhabits warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and is a secondary cavity nester. Nest trees in 2 Oregon studies were 22-28 inches dbh (McCallum 1994). Habitats used have open to moderate canopy closure (30 to 50%) with at least 2 canopy layers, and are often adjacent to small clearings. It subsists primarily on insects and is considered a

sensitive species in Montana. Periodic underburns may contribute to increasing habitat suitability for flammulated owls because low intensity fires would reduce understory density of seedlings and saplings, while periodically stimulating shrub growth. Within the project area there are approximately 43 acres of flammulated owl preferred habitat types.

3.2.12.2 Pileated Woodpeckers

The pileated woodpecker is one of the largest woodpeckers in North America (15-19 inches in length), feeding primarily on carpenter ants (*Camponotus* spp.) and wood boring beetle larvae (Bull and Jackson 1995). The pileated woodpecker nests and roosts in larger diameter snags, typically in mature to old-growth forest stands (Bull et al. 1992) (McClelland et al. 1979). Due primarily to its large size, pileated woodpeckers require nest snags averaging 29 inches dbh, but have been known to nest in snags as small as 15 inches dbh in Montana (McClelland 1979). Pairs of pileated woodpeckers excavate 2-3 snags for potential nesting sites each year (Bull and Jackson 1995). Snags used for roosting are slightly smaller, averaging 27 inches dbh (Bull et al. 1992). Overall, McClelland (1979) found pileated woodpeckers to nest and roost primarily in western larch, ponderosa pine, and black cottonwood. Carpenter ants, the primary prey of pileated woodpeckers, tend to prefer western larch logs with a large end diameter greater than 20 inches (Torgersen and Bull 1995). Thus, pileated woodpeckers generally prefer western larch and ponderosa pine snags > 15 inches dbh for nesting and roosting, and would likely feed on downed larch logs with a large end diameter greater than 20 inches.

Within the project area, there are approximately 245 acres that likely contain trees with dbh $\geq$ 15 inches, and with crown closures > 40% that would be considered potential pileated woodpecker habitat (SLI database). There have been several observations of pileated woodpeckers within a 7-mile radius of the project area in the past, as well as foraging trees located within the project area (Natural Heritage Database). The cumulative effects analysis area will encompass the project area and a 1-mile radius surrounding the affected School Trust parcels.

3.2.12.3 Fisher

The fisher is a medium-sized mammal belonging to the weasel family. Fishers prefer dense, lowland spruce-fir forests with high canopy closure, and avoid forests with little overhead cover and open areas (Powell 1978, Powell 1978, Powell 1977, Kelly 1977, Powell 1977, Kelly 1977, Clem 1977, Coulter 1966, Coulter 1966). For resting and denning, fishers typically use hollow trees, logs and stumps, brush piles, and holes in the ground (Coulter 1966, Powell 1977).

Within a 1-mile radius of the project area, there is a total of approximately 4,159 acres of fisher preferred habitat types, with approximately 397 acres on the affected School Trust parcel. However, there would likely be a low probability of fishers occurring north of Interstate 90 (B. Kennedy, USFS Wildlife Biologist, pers. comm., 8 August 2006). Within the project area, the most suitable habitat is along the forested riparian areas of

Timber Creek and the West Fork Timber Creek. These riparian areas total approximately 61 acres.

3.2.13 Big Game

3.2.13.1 White-tailed Deer and Elk

Densely stocked thickets of conifer regeneration and overstocked mature stands provide thermal protection and hiding cover for deer and elk in winter, which can reduce energy expenditures and stress associated with cold temperatures, wind, and human-caused disturbance. Areas with densely stocked mature trees are also important for snow interception, which makes travel and foraging less stressful for deer during periods when snow is deep. Dense stands that are well connected provide for animal movements across wintering areas during periods with deep snow, which improves their ability to find forage and shelter under varied environmental conditions. Thus, removing cover that is important for wintering deer through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local deer herds. Within the project area, there are approximately 193 acres of densely canopied forest, which could provide snow-intercept, and possibly thermal cover for deer and elk. Additionally, grazing of domesticated livestock does not occur on this parcel.

3.2.13.2 Moose

Moose are the largest ungulate in North America, distributed throughout Alaska, Canada, and many of the border states. In general, moose habitat includes: areas of abundant high-quality winter browse; shelter areas that allow access to food; isolated sites for calving; aquatic feeding areas, young forest stands with deciduous shrubs and forbs for summer feeding; mature forest that provides shelter from snow or heat; and mineral licks (Thompson and Stewart 1998). As such, much of the project area receives use by moose. The 53,920 acre analysis area for moose corresponds with MT FWP-mapped winter range and other habitat. There are approximately 4,867 acres of seed-tree/shelterwood harvest, clearcuts, and grassland within the analysis area, and approximately 207 acres located within the project area.

3.2.14 Other Species

3.2.14.1 Northern Goshawk

The northern goshawk is a forest habitat generalist with specific nesting habitat requirements (McGrath et al. 2003, Squires and Reynolds 1997, Reynolds et al. 1992). The goshawk forages on a wide range of species, with the most predominant prey being snowshoe hare, Columbian ground squirrels, red squirrels, blue and ruffed grouse, northern flickers, American robins, gray jays, and Clark's nutcrackers (Squires 2000, Clough 2000, Watson et al. 1998, Cutler et al. 1996, Boal and Mannan 1996, Reynolds et

al. 1992). Thus, given the diverse array of prey species, goshawks forage from a diverse array of habitats. However, (Beier and Drennan 1997) found goshawks to forage in areas based primarily on habitat characteristics rather than prey abundance. Beier and Drennan (1997) found goshawks to forage selectively in forests with a high density of large trees, greater canopy closure, high basal area, and relatively open understories. For nest stands, goshawks will nest in pine, fir, and aspen stands on north-facing slopes that are typically in the stem exclusion or understory reinitiation stages of stand development, with higher canopy closure and basal area than available in the surrounding landscape (McGrath et al. 2003, Finn et al. 2002, Clough 2000, Squires and Reynolds 1997, Reynolds et al. 1992). Nests are typically surrounded by stem exclusion and understory reinitiation stands (with canopy closure $\geq$ 50%) within the 74 acres surrounding the nest; higher habitat heterogeneity than the surrounding landscape, and an avoidance of stands in the stand initiation stage of stand development typify habitat in the 205 acres surrounding goshawk nests (McGrath et al. 2003). Goshawk home ranges vary in area from 1,200 to 12,000 acres depending on forest type, prey availability, and intraspecific competition (Squires and Reynolds 1997).

Within the 5,765 acre analysis area for goshawks, approximately 2,385 acres have recently been affected by timber harvest or clearings associated with private residences or the Interstate. Thus, approximately 3,380 acres of the analysis area (approximately 59%) have forested stands with canopy closure >50% (using orthophotos from 2005). Much of the forested area within the project area could be used by goshawks for either foraging or nesting habitat. A potential goshawk nest was located within the project area in 2005. However, no sign of recent use of the nest site was observed (M. McGrath, SWLO Wildlife Biologist, personal observation).

4.0 Environmental Consequences

4.1 Introduction

This chapter describes the environmental effects of each alternative on the resources described in Chapter 3 and provides a scientific and analytic basis for comparison of alternatives found in Chapter 2. This chapter is also designed to provide the analytic process used to evaluate impacts.

4.2 Predicted Effects of Alternatives on Relevant Resources

4.2.1 Soil Resources

4.2.1.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Alternative A: Deferred Harvest (No Action) would have minimal effects on soil resources consistent with described existing conditions for soils. Existing roads could require routine maintenance in the future

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4.2.1.2 Alternative B: Harvest – Direct and Indirect Effects

Primary soil concerns are potential for excessive surface disturbance, erosion or soil compaction with harvest operations. Recent harvest were completed consistent with BMP and did not result in excessive soil impacts. To maintain soil productivity, and promote conifer regeneration, BMP's and the listed mitigation measures would be implemented to minimize the area and degree of soil effects associated with harvest operations. Mitigations include skid trail planning, limiting season of use to dry or frozen conditions, installing drainage where needed and retaining a portion of woody debris for nutrients and to control erosion on disturbed sites (DNRC 2004).

For nutrient cycling it is desirable to leave woody debris (>3" dia.) at ~5-10 tons/acre on the harvest units. Lodgepole pine mortality has resulted in trees shedding their needles, which helps return nutrients to the soil. Slash would be processed in the woods or return skidded from the landings to facilitate nutrient cycling. Protection of established regeneration and healthy over-story trees would be a priority. Portions of the harvest area would be scarified and jackpot burned to promote tree regeneration. The machine scarification would be limited to slopes of 35% or less to avoid excessive soil displacement that would affect soil productivity. Site specific road reconstruction requirements would be implemented to improve road drainage and control erosion. Temporary roads would be stabilized and revegetated. For these reasons, there is a low risk of direct and indirect effects to soil resources as a result of the proposed action.

4.2.1.3 Cumulative Effects of Alternative B: Harvest

Cumulative effects to soils can occur from repeated ground skidding entries into the harvest area and additional road construction, depending on area. There are minimal effects from the previous harvest in 1994 and the harvest units have been regenerated. No eroded or deeply rutted skid trails were noted during field reviews of the site. The temporary stream crossing sites and low standard road in the SW corner of the project area are well vegetated and stable. There is low risk of cumulative effects based on the implementation of BMP's, and mitigation measures that would minimize the area of detrimental soil impacts to less than 15% of harvest units. This level of effects is consistent with DNRC soil monitoring (DNRC 2004). Large woody debris would be retained for nutrient cycling and long term productivity.

4.2.2 Water Quality

4.2.2.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Deferred Harvest (No Action) would have minimal effects on water quality and consistent with the described existing conditions. Sediment from County roads may occur in flux, depending on the levels of road maintenance. Road maintenance would continue as needed.

4.2.2.2 Alternative B: Harvest – Direct and Indirect Effects

The primary risk to water quality is associated with roads and especially stream crossings or sites where sediment could be delivered to stream channels. The proposed action would construct 1.39 miles of new road located well away from surface water, presenting a low risk of sedimentation. Drainage features including ditches, culverts and drain dips would be incorporated into new road construction and vegetation would be regenerated to control erosion on disturbed soils. Road maintenance and reconstruction would be completed on existing roads to improve drainage and would be maintained concurrently with operations to reduce maintenance needs. To prevent stream channel disturbance and sedimentation, a temporary bridge would be installed across The West Fork of Timber Creek. The bridge would be located on existing gravel-based pads at a stable crossing site used in 1994. The temporary bridge installation would not disturb the stream banks and has low risk of sedimentation.

Logging equipment operation can directly impact water quality if off-site erosion occurs. Protection boundaries (SMZ's and RMZ's) would be located along harvest unit segments that are adjacent to Timber Creek, The West Fork of Timber Creek, ephemeral streams and wetlands. The protective boundaries would restrict equipment operation to protect vegetation and prevent erosion and sediment delivery consistent with Forest Management Rules for protection of streams with sensitive fish species. Harvest operations would include cable harvest of slopes over 45% to avoid excessive disturbance or erosion. The proposed ground based timber harvest would present a low risk of on-site erosion and sediment delivery to Timber Creek and The West Fork of Timber Creek

The DNRC would implement all applicable BMP's, Forest Management Rules and site-specific mitigation measures to control erosion and protect water quality. The proposed timber harvest and road maintenance is expected to result in low risk of direct or in-direct water quality impacts from erosion and sediment delivery due to buffer distances and implementation of mitigation measures. For these reasons, there is low risk of impacts to water quality or downstream beneficial uses occurring as a result of the proposed action surface drainage. These measures are expected to reduce erosion and sediment delivery potential to adjacent stream channels and draw bottoms.

4.2.3 Cumulative Watershed Effects

4.2.3.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Alternative A: Deferred Harvest (No Action) would have low cumulative effects from past management activities consistent with the description of the existing conditions. Water yields may increase naturally, but not substantially, as older lodgepole stands are attacked by beetles and die. Those increases are expected to be well below detrimental levels. As hydrologic recovery continues to occur it is reasonable to assume that these effects would decline.

4.2.3.2 Alternative B: Harvest – Direct and Indirect Effects

The proposed action would create an additional 123 acres of equivalent clearcut area (ECA) as noted in the following table.

Table 4.1 Summary of Predicted Watershed Conditions of Action Alternative	
Total Watershed Area (acres)	5232
Proposed Harvest Acres	258 (5% Watershed)
Proposed ECA (acres)	123
Predicted Water Yield Increase	< 2.5 %
Total ECA in Watershed	978
Watershed in ECA 2006	18.5%

The level of harvest on DNRC lands as a proportion of the drainage area (5%) is relatively low and the project is located near the valley floor with relatively low level of precipitation (average 25 inches/yr). The canopy removal associated with the proposed harvest would not noticeably increase water yield compared to the lost canopy interception and evapotranspiration associated with deferred harvest and continued extensive lodgepole pine mortality. As a result, there is a low risk of cumulative watershed impacts due to water yield and sediment yield increases occurring from this proposal due to the following reasons. There would be a moderate amount of ECA and potential water yield increase in Timber Creek from the proposed action. The proposed selection harvest could be expected to accelerate growth and vigor of the retained stand. The proposed levels of harvest are below those normally associated with detrimental increases in peak flow or duration of peak flows. Stream channels within the project area are stable and water yield is below those levels normally associated with detrimental

impacts to stream channel stability and function. Therefore, there is low risk of cumulative watershed effects as a result of this project.

4.2.4 Cold Water Fisheries

4.2.4.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Alternative A: Deferred Harvest (No Action) would have minimal effects on fish habitat consistent with the described existing conditions for fisheries.

4.2.4.2 Alternative B: Harvest – Direct and Indirect Effects

The implementation of Alternative B: Harvest would remove dead, dying and threatened lodgepole pine from sites adjacent to the SMZ's and RMZ's on Timber Creek and the West Fork of Timber Creek. SMZ's and RMZ's would provide riparian protection and the extensive amounts of riparian shrubs would continue to provide stream shading. Selection harvest would occur within a segment of RMZ adjacent to the West Fork of Timber Creek where the Packer Creek Road separates the creek from the harvest unit and slopes do not exceed 15%. SMZ protection would be applied on this stream segment. There would be low risk of direct or indirect effects from erosion, sediment delivery or temperature change to fish habitat.

4.2.4.3 Cumulative Effects of Alternative B: Harvest

There is a low risk of cumulative impacts to fisheries in Timber Creek and the West Fork of Timber Creek with the proposed timber harvest and road construction, due to the following reasons:

1) SMZ and RMZ boundaries would be established to prevent disturbance near water resources and protect vegetation.

2) Combined mitigation measures for harvest operations and season of use would all be directed at minimizing soil disturbance to prevent erosion and sedimentation.

3) No new roads would be constructed adjacent to streams.

4) A temporary bridge would be used to access the Southwest harvest area using an existing crossing site to prevent stream bank impacts and sedimentation.

5) Streamside snags and recruitable trees would be retained to provide for long term woody debris availability to stream channels to maintain fisheries habitat.

For these reasons, there is low risk of sediment delivery increases in stream water temperatures or impacts to potential fish habitat are expected to occur as a result of the proposed action alternative.

4.2.5 Air Quality

4.2.5.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Unpaved public roads would continue to produce a minor amount of dust during dry periods. Potential smoke associated with wildfires would continue to be a threat to air quality. Continued ORV and non-motorized public recreation in the project area presents an increased risk of wildfire ignition. In the event of wildfire, air quality would be affected. Impacts to air quality associated with logging slash disposal would not occur under the No Action Alternative.

4.2.5.2 Alternative B: Harvest – Direct and Indirect Effects

Mitigations for soil nutrient retention would require that slash produced by the harvest remain on site. As a result, burning of slash piles would likely not occur or would be minimal. Burning of slash accumulations to reduce wildfire risk, if necessary, would occur when atmospheric conditions are conducive to smoke dispersion.

Dust created by log trucks on gravel roads or logging machinery operating on dry soils could temporarily degrade air quality locally. Dust control measures on gravel roads adjacent to residences would minimize dust associated with log trucks. The potential wildfire risk presented by logging equipment operation during the dry season could negatively impact air quality.

4.2.5.3 Cumulative Effects of Alternative B: Harvest

Smoke resulting from this project could have a cumulative effect with other prescribed burns being conducted in the region as well as with pollutants produced from other sources. The cumulative impact to air quality would be minor and of short duration as result of the proposed action.

4.2.6 Noxious Weeds

4.2.6.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

With no action, noxious weeds (spotted knapweed and oxeye daisy) will continue to spread along roads and increase on the drier site habitats.

4.2.6.2 Alternative B: Harvest – Direct and Indirect Effects

Implementation of Alternative B: Harvest would involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. For the Alternative B: Harvest, an Integrated Weed Management (IWM) approach was considered. Prevention, revegetation and weed control measures for spot outbreaks are considered the most effective weed management treatments for this project. Noxious weed density and occurrence would be similar or potentially slightly higher due to soil

disturbance and decreased tree canopy. Control efforts would promote revegetation and emphasize treatment of any new noxious weeds. More weed control would occur compared to no-action alternative.

Herbicide application would be completed to contain spotted knapweed and oxeye daisy along segments of spot infested road. Herbicide would be applied according to label directions, laws and rules, and would be applied with adequate buffers to prevent herbicide runoff into surface water. Implementation of IWM measures listed in the mitigations would reduce existing weeds, limit the possible spread of weeds, and improve current conditions, to promote existing native vegetation.

4.2.6.3 Cumulative Effects of Alternative B: Harvest

Disturbance of soils and vegetation from the construction of roads and from skid trails could cause increased competition between noxious weeds and native species and decrease soil productivity and stability. A combination of prevention, revegetation and monitoring would be implemented to reduce the possible infestation and spread of weeds associated with this project.

4.2.7 Forest Conditions and Forest Health

4.2.7.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Under the Alternative A: Deferred Harvest (No Action) harvesting would not take place at this time and tree growth and stand productivity would continue to decline as a result of insect attack and competition. Shade tolerant species would continue to increase, creating conditions unsuitable for regeneration of seral species such as western larch and western white pine.

4.2.7.2 Alternative B: Harvest – Direct and Indirect Effects

Implementation of the action alternative would alter stand condition considerably. The proposed timber harvest would reduce the tree canopy cover in the harvest units by approximately 40-60%, reducing competition to mature dominant and codominant trees. Species composition would become dominated by shade intolerant species and age classes would be more evenly distributed. Release of advanced lodgepole pine regeneration would likely result in dense (1000-4000 trees per acre) understory stand. Treatment would improve species and structural diversity by favoring seral species and retaining trees of multiple age classes.

Growth rates should increase dramatically due to reduced competition, and other plant species currently on the site such as grass, forb, and shrub species should also experience an increase in growth and vigor due to canopy reduction and nutrient release. The residual stand dbh would be more variable than that of the present stand, as trees of all diameter classes would be retained.

4.2.7.3 Cumulative Effects of Alternative B: Harvest

Implementation of Alternative B: Harvest would bring approximately 50 acres of previously unentered stands into active management. Treatment of these stands as well as treatment of previously managed stands would result in a cover type conversion of approximately 188 acres and would alter age and size class distribution on 248 acres of the project area. The resulting stands would be mixed species, multi-aged stands dominated by shade intolerant species in the overstory and lodgepole pine in the understory.

Due to the clumpy nature of the existing mature western larch and Douglas-fir, occasional openings of ½ acre or more may occur in units with a proposed Individual Tree Selection prescription. 37 acres of lodgepole pine to be treated through an Overstory Removal prescription would result in a large stand of lodgepole pine and western white pine regeneration without mature retention trees.

4.2.8 Heavy Truck Traffic and Public Safety

4.2.8.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Under Alternative A: Deferred Harvest, commercial log hauling would not take place. Dust and noise produced by log trucks and logging equipment would not occur in the project area as a result of the proposed action.

4.2.8.2 Alternative B: Harvest – Direct and Indirect Effects

Commercial trucks could produce a significant amount of dust on unpaved roads. Dust would likely be insignificant when hauling occurs on frozen or snow covered roads. Visibility and air quality could be negatively impacted by heavy truck traffic.

Noise produced by heavy truck engines and compression brakes could disturb adjacent homeowners and individuals recreating in the vicinity. Heavy trucks may present a traffic hazard on public roads due to the size and mass of these vehicles.

4.2.9 ORV Access

4.2.9.1 Alternative A: Direct and Indirect Effects

Disturbance from ORV operation may result in avoidance of the project area by many wildlife species, including threatened, endangered and sensitive species. Use of established trails would contribute to soil and watershed impacts. User conflict would likely continue to increase as a result of ORV operation on designated closed roads.

4.2.9.2 Alternative B: Direct and Indirect Effects

Closure of trails through posted signs, and earth and vegetation barriers would reduce potential wildlife disturbance and user conflict. ORV users may be opposed to closure of these trails. ORV use could potentially increase on adjacent lands.

4.2.10 Visual Quality

4.2.10.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Under Alternative A: Deferred Harvest (No Action) road building and harvesting would not take place. There would be no immediate change to visual quality as a result of forest management. Continued lodgepole pine mortality could reduce the aesthetic quality of the site due to the appearance of large areas of dead trees. Stand replacing fires could similarly reduce the visual appeal of the site.

4.2.10.2 Alternative B: Harvest – Direct and Indirect Effects

Proposed new road construction could reduce the visual appeal by exposing bare soil and creating unnatural patterns on the landscape, though retained canopy would block the view of new roads considerably. These roads would remain in place but would be closed to all public motorized traffic and revegetated after harvest.

The commercial thinning proposed for the Douglas-fir stands would maintain a forested appearance with a more open canopy. An average of 100 trees per acre would be retained in these units. When the ground is snow covered, the portions of harvest units over approximately 35% slope may appear as a mottled white and green as opposed to the solid green look of a forest with a closed tree canopy. Cable skidding corridors may be temporarily visible in the form of narrow vertical strips of open canopy. Red needled slash may temporarily detract from the quality of the site.

Individual Tree Selection and Overstory Removal prescriptions applied to lodgepole pine and mixed conifer stands would have a variable effect on visual aesthetics. Lodgepole pine is such a small component on some stands that the effect may not be visible, while other stands may appear considerably more open. The open stands of 10-20”dbh western larch, Douglas-fir and ponderosa pine that would remain after harvest may be desirable in appearance to some individuals. The short term effect on aesthetics is likely to be negative due to the appearance of fresh slash, stumps and skid trails. The absence of the current lodgepole pine canopy would also likely have a temporary negative effect on visual appearance.

4.2.10.3 Cumulative Effects of Alternative B: Harvest

Cumulative effects should be moderate in the short term. Following treatment all stands would have a more open appearance. Some stands may have continuous canopy openings

as large as ten acres, rapidly filling with existing regeneration. Proposed roads may have a minor effect until vegetation becomes established on disturbed soil and tree crowns obscure the road location.

4.2.11 Economics

4.2.11.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Under Alternative A: Deferred Harvest (No Action) harvesting would not take place and no new revenue would be generated.

4.2.11.2 Alternative B: Harvest – Direct and Indirect Effects

Approximately $315,000 in gross revenue would be generated for the Common School Trust from the harvest and sale of the estimated 1.5 MMBF. Stumpage value is estimated at $200/MMBF. Responsibility for development costs associated with the project would be assigned to the purchaser and administered by the Forest Officer. Development costs for the project are estimated at approximately $30,000 for 1.6 miles of new construction, existing road improvements, materials and the installation and removal of a temporary bridge,

The amount of Forest Improvement (FI) monies collection from this sale would be $16.27/MBF of sawlogs harvested. The FI collection would be approximately $24,400 which would be applied to forest improvement projects both on and off this particular site. FI expenditures in the project area may include weed spraying, pre-commercial thinning or tree planting and may require an investment of up to $10,000 in the next decade.

If this proposed project was implemented, it would provide work for a road building contractor, a logging contractor, their subcontractors, and their employees. The forest products would most likely be processed in local mills providing further job opportunities and contributing to local, state and federal tax revenues.

4.2.12 Fire Hazard

4.2.12.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

Dense lodgepole pine stands with high mortality from mountain pine beetle infection would continue to create a heavy accumulation of standing dead fuel and increase the risk of high intensity stand replacing fire (Fisher and Bradley, 1987) Ladder fuels created by dense grand fir and lodgepole pine regeneration would continue to present the possibility for fire to climb into the overstory. Open public roads, heavy off-road vehicle operation, firewood cutting and non-motorized public recreation would continue to present significant ignition sources for wildfire.

4.2.12.2 Alternative B: Harvest- Direct and Indirect Effects

Surface slash accumulations resulting from timber harvest could create a short term fire hazard. Logging equipment operation poses a risk of ignition near fuel sources such as log decks and slash accumulations. Removal of standing dead timber could reduce the fire hazard, and would likely reduce the potential intensity of fires that could occur in the project area.

4.2.13 Endangered Species

4.2.13.1 Grey Wolves

4.2.13.1.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest

4.2.13.1.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.13.1.3 Alternative B: Harvest – Direct and Indirect Effects

Through a proposed timber harvest, the proposed action would reduce vegetative screening on approximately 250 acres, and effectively close approximately 0.5 mile of road to motorized access. Additionally, riparian buffers would be retained that would promote travel corridors for prey, and potential escape cover for wolves. While the proposed action would reduce visual screening cover, there are no known den or rendezvous sites within 1 mile of the affected parcel. As a result, there would likely be low risk of direct or indirect effects to wolves from the proposed action.

4.2.13.1.4 Cumulative Effects of Alternative B: Harvest

Within the analysis area, there is relatively little livestock grazing. Given the limited amount of grazing, road densities, and limited spatial extent of the proposed action, there would likely be low risk of cumulative effects to gray wolves as a result of the proposed action. However, should a den or rendezvous site be located within 1 mile of the affected parcel, operations would halt and a DNRC wildlife biologist would be consulted and additional mitigations would be developed and implemented.

4.2.13.2 Grizzly Bears

4.2.13.2.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.13.2.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.13.2.3 Alternative B: Harvest – Direct and Indirect Effects

The proposed action would effectively close approximately 0.5 mile of currently open road, construct approximately 1.39 miles of new road that would be effectively closed post-harvest, harvest approximately 188 acres with an individual tree selection prescription, approximately 23 acres through a commercial thinning, and approximately 37 acres in an overstory removal. As a result, sight distance and total road density would increase, but open road density for motorized access would be reduced from 2.21 miles of open road per square mile to approximately 1.38 miles of open road per square mile. Additionally, the proposed action would retain a minimum buffer of approximately 75 ft, but usually more, on Timber Creek and West Fork Timber Creek. These buffers would provide travel corridors, riparian habitat, cover, and forage for grizzly bears. As a result of the proposed reductions in open road density, riparian buffers, and low population levels in the nearby Cabinet Yaak recovery zone, there would likely be low risk of direct and indirect effects to grizzly bears as a result of the proposed action.

4.2.13.2.4 Cumulative Effects of Alternative B: Harvest

Within the grizzly bear cumulative effects analysis area, approximately 75 of the 248 square miles (30%) are currently unroaded and managed by the Lolo National Forest, which is mandated by the Endangered Species Act to assist in the recovery of federally Threatened and Endangered species. The proposed action would marginally reduce open road densities through the effective closure of approximately 0.5 mile of open road, and would increase total road density from 1.84 to approximately 1.85 miles of road per square mile through construction of approximately 1.39 miles of road that would be closed to motor vehicle access post-harvest. Additionally, with the aforementioned timber harvest, riparian buffers would be retained that would provide travel corridors, riparian habitat, cover, and forage for grizzly bears. With implementation of the mitigation measures, low Cabinet Yaak grizzly bear population levels, and the unroaded U.S. Forest Service lands within the analysis area, there would likely be low risk of cumulative effects to grizzly bears as a result of the proposed action.

4.2.13.3 Canada Lynx

4.2.13.3.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.13.3.2 Cumulative Effects of Alternative A: Deferred Harvest (No Harvest)

No change from current conditions would be expected under Alternative A: Deferred Harvest

4.2.13.3.3 Alternative B: Harvest – Direct and Indirect Effects

The proposed action would harvest timber within approximately 37 acres of the existing 143 acres of mature foraging habitat, and approximately 205 acres of the existing 252 acres of "Other" habitat within the affected parcel. However, two patches of mature foraging habitat totaling approximately 55 acres would be retained along the Timber Creek and the West Fork of Timber Creek riparian corridors. Additionally, snag recruits would be clustered near these corridors to provide for future coarse woody debris recruitment, which would likely provide future habitat for prey species such as snowshoe hares and red squirrels. Because much of proposed harvest units 1, 2, and 3 have well-established seedlings and saplings, much of the affected lynx habitat would likely remain in the "Other" habitat category post-harvest. Thus, with retention of corridors of mature foraging habitat and likely post-harvest "Other" habitat conditions, there would likely be low risk of direct and indirect effects to lynx as a result of the proposed action.

4.3.13.3.4 Cumulative Effects of Alternative B: Harvest

The proposed action would harvest timber within approximately 37 acres of the existing 143 acres of mature foraging habitat, and approximately 205 acres of the existing 252 acres of "Other" habitat within the affected parcel. However, two patches of mature foraging habitat totaling approximately 55 acres would be retained along the Timber Creek and the West Fork of Timber Creek riparian corridors. Additionally, snag recruits would be clustered near these corridors to provide for future coarse woody debris recruitment, which would likely provide future habitat for prey species such as snowshoe hares and red squirrels. Because much of proposed harvest units 1, 2, and 3 have well-established seedlings and saplings, much of the affected lynx habitat would likely remain in the "Other" habitat category post-harvest. Thus, with retention of corridors of mature foraging habitat and likely post-harvest "Other" habitat conditions, there would likely be low risk of direct and indirect effects to lynx as a result of the proposed action.

4.2.14 Sensitive Species

4.2.14.1 Flammulated Owls

4.2.14.1.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.14.1.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

No change from current conditions would be expected under Alternative A: Deferred Harvest

4.2.14.1.3 Alternative B: Harvest—Direct, Indirect and Cumulative Effects

The proposed action would harvest timber within approximately 20.6 acres of the approximately 43 acres of flammulated owl-associated habitat types within the affected parcel. Of the 20.6 acres, approximately 20 acres would not be considered suitable flammulated owl habitat due to high canopy closure and lack of complex structural development. The proposed action prescribes an individual tree selection treatment for the 20 acres considered to be too dense for this species. As a result, the proposed treatment would likely open the forest stand and promote forest regeneration and future flammulated owl habitat. Thus, the proposed action may improve flammulated owl habitat in the long term. Therefore, the proposed action would likely have low risk of negative direct, indirect or cumulative effects to this species.

4.2.14.2 Pileated Woodpeckers

4.2.14.2.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.14.2.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.14.2.3 Alternative B: Harvest – Direct and Indirect Effects

Of the approximately 245 acres of potential pileated woodpecker habitat within the project area, the proposed action would harvest timber in approximately 98 acres, largely through commercial thinning and individual tree selection. However, the proposed action

would not enter approximately 49 acres of the most suitable pileated woodpecker habitat that occurs along two riparian areas within the project area. Post-harvest, much of the 98 acres of affected potential pileated woodpecker habitat would likely be below 50% crown closure, and may not contain potential nest sites as a result of the reduction in crown closure. Of the affected 98 acres, the most impact would be within the 23 acres covered by Harvest Unit 5. These acres currently provide potential foraging habitat. The remaining 75 acres of affected habitat currently has marginal crown closure for this species and may provide occasional foraging opportunities. Through avoidance of the two riparian areas, the proposed action would retain the most suitable pileated woodpecker nesting and foraging habitat within the project area, and would partially mitigate for potential losses of foraging habitat affected by Harvest Unit 5. As a result, there would likely be low to moderate risk of direct and indirect effects to pileated woodpeckers from the proposed action.

4.2.14.2.4 Cumulative Effects of Alternative B: Harvest

Within the approximately 5,765 acre analysis area, approximately 2,385 acres (41%) has been affected by timber harvest or clearings associated with private residences or Interstate 90. Such areas currently may not be considered as habitat for pileated woodpeckers. The proposed action may increase this estimate through harvesting timber on approximately 98 acres that may contain suitable habitat. This may result in a 2% increase of temporarily unsuitable habitat within the analysis area. Given the habitat changes within the analysis area, there may be low to moderate risk of cumulative effects to pileated woodpeckers as a result of the proposed action.

4.2.14.3 Fisher

4.2.14.3.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under the no action alternative.

4.2.14.3.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

No change from current conditions would be expected under the no action alternative.

4.2.14.3.3 Alternative B: Harvest – Direct and Indirect Effects

The proposed action would harvest timber within approximately 250 acres of habitat types (Pfister et al. 1977) associated with fisher. Of these acres, only approximately 57 acres that would be treated with an individual tree selection prescription could currently be considered potential fisher habitat due to forest structure and development. Post-harvest, the affected 57 acres of potential fisher habitat would likely not be suitable fisher habitat for at least 40 years. However, the proposed action would also retain wide riparian buffers along Timber Creek and West Fork Timber Creek, where fisher habitat currently exists, and subsequently retain fisher corridors in existing habitat. These

corridors would total approximately 55 acres. Thus, while the proposed action would temporarily reduce the availability of fisher habitat within the project area, the highest quality habitat would be retained. As a result, there may be a low risk of direct and indirect effects to fishers from the proposed action.

4.2.14.3.4 Cumulative Effects of Alternative B: Harvest

Within the analysis area (1-mile radius surrounding the affected parcel), the USFS has scoped a fuels reduction project (DeBaugan Fuels Reduction Project, 7 February 2006), which would partially occur in sections 20 and 22. As scoped, the fuels reduction project would employ heavy thinning/shelterwood and commercial thinning prescriptions, as well as slash and burn piles. These actions would treat fisher habitat on the affected USFS lands that is disconnected from fisher habitat within the DNRC project area due to past timber harvests on adjacent private lands. Additionally, recent past timber harvests within the analysis area has temporarily reduced available fisher habitat by approximately 1,230 acres. The proposed action would further temporarily reduce available fisher habitat by approximately 57 acres, while retaining approximately 55 acres of higher quality habitat along riparian corridors. While the proposed action, coupled with the proposed action on USFS land, would likely reduce the amount of available fisher habitat, such action may not affect fishers due to a lack of fisher presence north of Interstate 90 (B. Kennedy, USFS Wildlife Biologist, pers. comm., 8 August 2006). As a result, there may be a low risk of cumulative effects to fisher from the proposed action.

4.2.15 Big Game

4.2.15.1. White-tailed Deer and Elk

4.2.15.1.1 Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.15.1.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.15.1.3 Alternative B: Harvest – Direct and Indirect Effects

The proposed action of harvesting timber on approximately 250 acres and effectively closing approximately 0.5 mile of existing road may benefit white-tail deer and elk summer range conditions. Through reductions in crown closure, there would be less competition for light affecting shade-intolerant forbs and grasses. As a result, such species should respond favorably to post-harvest conditions, providing more abundant and nutritious forage for white-tailed deer and elk. Effectively closing both the 0.5 mile

of existing road and the proposed new road construction would also aid in reducing human-related mortality during the hunting season. Thus, there would likely be low risk of negative direct and indirect effects to white-tailed deer and elk summer range as a result of the proposed action.

4.2.15.1.4 Cumulative Effect of Alternative B: Harvest

A large proportion of Hunting District 200 is managed by the U.S. Forest Service and does not contain roads. Past timber harvests have largely occurred in the southern portion of the hunting district, and have improved summer range for white-tailed deer and elk through improving the abundance and nutrition of desirable grasses and forbs. The proposed action would likely continue this trend through the proposed treatment of approximately 250 acres. Thus, there would likely be low risk of negative cumulative effects to these species as a result of the proposed action.

4.2.15.2 Moose

4.2.15.2.1 Alternative A: Deferred Harvest (No Action)—Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.15.2.2 Alternative A: Deferred Harvest (No Action)—Cumulative Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.15.2.3 Alternative B: Harvest—Direct and Indirect Effects

The proposed action would reduce crown closure on approximately 250 acres, while a total of approximately 55 acres of riparian forest in two riparian corridors would not be entered. As a result, moose would be able to utilize the riparian corridors in winter and benefit from the associated reduced snow levels, while having access to nearby abundant and more nutritious forage that would likely result from the proposed timber harvest. While the proposed action would reduce snow intercept cover within the project area, particularly in Harvest Unit 5, the juxtaposition of snow intercept cover in the riparian corridors with resulting forage in the adjacent harvest units would likely benefit moose winter range. Thus, there would likely be low risk of direct and indirect effects to moose winter range as a result of the proposed action.

4.2.15.2.4 Alternative B: Harvest—Cumulative Effects

Approximately 44,715 acres of the 53,920 acre analysis area (83%) is managed by the U.S. Forest Service, with portions of that acreage containing moose winter range. As moose winter range is currently mapped (Montana Fish, Wildlife & Parks, April 4, 2001), the project area is currently not considered to be moose winter range. As a result, there would likely be low risk of cumulative effects to moose winter range from the proposed action.

4.2.16 Other Species

4.2.16.1 Northern Goshawk

4.2.16.1.1 Alternative A: Deferred Harvest (No Action)—Direct and Indirect Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.16.1.2 Alternative A: Deferred Harvest (No Action)—Cumulative Effects

No change from current conditions would be expected under Alternative A: Deferred Harvest.

4.2.16.1.3 Alternative B: Harvest—Direct and Indirect Effects

The proposed action, as previously stated, would harvest approximately 250 acres through overstory removal, individual tree selection, and commercial thinning prescriptions, while also constructing approximately 1.39 miles of new road within the project area. Of the affected acres, approximately 46 acres would be harvested within a circular 74-acre nest stand surrounding the unknown nest, primarily through an individual tree selection prescription (approximately 36 acres),and approximately 0.8 miles of new road would be constructed in the same area. However, approximately 3.8 acres surrounding the nest would not be entered in an effort to partially mitigate effects from the proposed harvest, as well as afford the nest protection from harvesting equipment (i.e., line machines). Such actions would likely reduce crown closure post-harvest, leaving the resulting stands in low canopy closure (i.e., <50%) stem exclusion and understory reinitiation structural stages (McGrath et al. 2003). Such structural changes within the nest area would likely render the nest as temporarily unsuitable for nesting by goshawks. However, the prescription would likely improve the long term suitability of the site, and would likely attain suitable nesting habitat characteristics within 20 to 25 years post-harvest. Within a circular 205 acre post-fledging area (PFA) surrounding the unknown nest (inclusive of the 74-acre nest stand), the proposed action would construct approximately 1.34 mile of new road, remove the overstory on approximately 17 acres, use an individual tree selection prescription on approximately 55.6 acres, and commercially thin approximately 23 acres. The post-harvest habitat within the 17 acre

overstory removal would be expected to resemble stand initiation structural conditions (Oliver and Larson 1996), given the advanced stage of regeneration present; the individual tree selection prescription would likely resemble stem exclusion with canopy closure < 50%; and the commercial thinning would continue to resemble an understory reinitiation stand with canopy closure < 50% post-harvest. Such post-harvest conditions would be expected to reduce the nest site suitability of the unknown nest to a point where it would be unsuitable for nesting by goshawks (sensu McGrath et al. 2003). However, the prescription would likely promote forest growth such that suitable nesting conditions may be achieved 20 to 30 years post-harvest. Beyond the scale of a goshawk PFA, the effects of the proposed action are less clear because it is unknown how goshawks would likely utilize the project area for foraging. Examining habitat only within the project area, the proposed harvest may temporarily (15 to 20 years) reduce foraging habitat suitability within the project area for goshawks. However, the proposed harvest would likely improve the long-term foraging suitability because the harvesting would: 1) favor retention of ponderosa pine, western white pine, and western larch, many of which are larger diameter; 2) foster conditions that would increase basal area; and 3) open the understory, which would subsequently make prey more readily available. Such effects describe habitat characteristics that goshawks select for foraging opportunities (Beier and Drennan 1997). Thus, within the project area, the proposed action may have low to moderate risk of reducing short-term (15 to 20 years) foraging habitat suitability, and longer term (20 – 30 years) effects on nesting. However, there may be greater long-term benefits.

4.2.16.1.4 Alternative B: Harvest—Cumulative Effects

The proposed action would increase the amount of forest fragmentation from approximately 41% (2,385 acres) of the analysis area to approximately 42% (2,442 acres); fragmenting the central portion of the analysis area in the process. While much of the past harvest within the analysis area has largely been seed-tree and clearcut regeneration, which produces habitat unsuitable for nesting and foraging, the proposed action would harvest largely through individual tree selection and retain forest structure throughout the harvest units. Habitat that would result from the proposed harvest would likely be marginally suitable foraging habitat in the short-term (15 to 20 years), and unsuitable nesting habitat within the harvest units. Current land management on adjacent U.S. Forest Service land would likely sustain local goshawk populations while the project area recovers. Thus, there would likely be low to moderate risk of cumulative effects to a potential goshawk territory as a result of the proposed action.

4.2.17 Cumulative Effects Associated with other DNRC Projects

Several other DNRC projects are either ongoing or have undergone scoping in the general area around the Timber Creek Project Area. The following table displays the name of the proposed activity, the year when activity is planned, and the type of activity proposed. Of the projects listed, all are outside of any Analysis Area used in this assessment and would have no measurable cumulative effects on wildlife considered in this assessment.

Table 4.1: OTHER DNRC MISSOULA UNIT ACTIVITIES

Project Name	Approximate Air miles from Timber Creek	Year of Proposed Activity	Description of proposed Activity
Mill Creek	62	2009	Sanitation/Selection
Davis Point	90	2007	Overstory Removal
Packer Gulch Fire Salvage	110	2007	Salvage
Tarkio Thinning	42	2007	Precommercial Thinning
Dry Gulch	100	2007	Shelterwood
Roman/Six Mile	20	2006	Thinning and PCT
Tyler Creek	34	2005	Shelterwood
Lolo Land Exchange	1/4 to 100 miles	2008	Land Exchange

5.0 List of Individuals Associated with the Project

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6.0 List of Agencies and Persons Consulted and/or Provided Copies of this EA.

Bob Henderson -Wildlife Biologist, DFWP, Missoula
Pat Rennie -Archeologist, AGMB, DNRC, Helena
Mack Long -Regional Supervisor, MT Fish Wildlife & Parks
Jason McCleese - Mineral County Road Department
Dana Boruch -DNRC Right of Way Specialist
Ecology Center
Alliance for the Wild Rockies

Local Citizens
Rex Lincoln
Jeannie Sage

Other locals notified or in attendance at public meeting available on request.

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